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BRIEFLY TOLD.

OBITUARY NOTE: MR. C. E. HEQUEMBOURG.—We are advised of the death of Mr. C. E. Hequembourg, who passed away at his home in Dunkirk, N. Y., the morning of October 17th, after a long illness. Practically unknown to the latest generation of those connected with the artificial gas industry in the periods between 1878 to 1898 he was well known in both artificial and natural gas operations. He was born in Troy, N. Y., December 19, 1844, and eventually earned the titling of Civil Engineer. He actively followed his profession for quite a while, and gained some fame therein, perhaps most notable in that respect being his permanent connection with the engineering force that originally planned and initially constructed the system and plant that finally resulted in the present water supply of Chicago. Early in the seventies he settled in the Bradford (Pa.) oil and gas regions, and about 1879 became connected with the Bradford (Pa.) Gas Company, of which concern he was elected President, and the affairs of which he managed during the early period of the development of natural gas and the growth of the electric lighting industry. He was a pioneer in the field of the use of gas for purposes other than lighting, and in the first half of the eighties was noted as an authority on the subject. Despite the strong competition experienced in and about the Bradford field by the organization of opposition, in fact, wild-cat opposition concerns, the Bradford Gas Light and Heating Company—for to such its name had been changed from the original title—kept well on its way until it was finally purchased by and amalgamated in the corporation known as the Manufacturers Gas Company, which itself was a consolidation of a large number of competing natural gas concerns. He was at one time quite prominent in the membership of the American Gas Light Association, which body he joined in 1881, and if we mistake not was also an active member of the Ohio Gas Light Association. Mr. Hequembourg, on retiring actively from the gas business (about 1888), removed to Dunkirk, N. Y., in the affairs of which city he became prominent. He served it for one or two terms as Mayor, and was much and well thought of by his fellow citizens. He is survived by a son and four daughters.

HANDBOOK OF AMERICAN GAS ENGINEERING PRACTICE: NISBET LATTA, 1907.—In our previous notice of this book we omitted, for lack of space at the time, some specific mention of its contents in detail. This we now give, in answer to a number of inquiries. The author states in the preface that he treats of the practical technology of gas supplies and divides his subject into three parts: "Water Gas Manufacture" (including practical details of operation); "The Distribution of Gas;" and "Technical Data." He also acknowledges the assistance of many engineers connected with gas companies and with supply houses, and gives credit in all cases for his sources of information. The book, in fact, is a compilation of the most practically useful information published to date upon the subjects treated, from an American point of view, and represents an immense amount of research into the output, both of the technical press and the proceedings of various gas associations.

Part I. has chapters entitled "The Generator," "The Carburetter," "The Superheater," "Washbox and Tar Scrubbers," "Condensers,"

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"Purifiers," "Exhausters," "Station Meters," "Holders," and "Details of Works' Operation."

Part II. deals with "Naphthaline," "Mains," "Services," "Consumers' Meters," "Pressure," "House Piping" and "Appliances."

Part III. treats of "Properties of Gases," "Steam," "Conversion Factors," "Pipe," "Miscellaneous Data" and contains mathematical tables for use in calculations.

Under the several chapter headings we give some of the subjects treated of therein:

The Generator.—Capacities of water gas sets, dimensions of blowers, blast pressures, grate areas, clinkering, steam, boilers, generator fuels, heat balances, carbonic acid, generator linings and safety devices.

The Carburetter.—Heats, brickwork, checkerbrick spacing, oil storage, oil analysis, measurement, preheating, spraying and values of oils for gas making.

The Superheater.—Heats, brickwork, checkerbrick and spacing.

Washbox and Tar.—Depth of seal, cleaning washbox, appearance of overflow water, use of water, water gas tar, composition and use of, tar pumps and tar separation.

Scrubbers.—Scrubbing, use of water, scrubber spraying devices, water analysis, condensers, outlet temperatures, of gas at various stages of manufacture, relative condensing surfaces, atmospheric and water, and effect of pressure on gas.

Purifiers.—Comstruction, capacities, speed, size of connections, purification materials, purification temperatures, oxide revivification and testing for impurities.

Exhausters.—Power used, capacities, speed, friction, slip and compressors.

Station Meters.—Capacities, various types, proper connections, testing of station meters and corrections for temperature.

Holders.—Pressure from, weighting of, freezing of water in, cleaning tanks, patching and wind pressure on.

Details of Works' Operation. Care of valves, maintenance of uniform candle power and recording of daily operations.

Part II.—*Gas Distribution.* Naphthaline, properties of, deposition, removal, prevention and tests for presence of in gas.

Mains.—Capacity, methods of laying, types of joints, leakage work, service connections, stoppers, repairing mains, various cost data—both high and low pressure systems are covered.

Services.—Tapping for, coatings for, anti-freezers, pipe driving jacks, high pressure connections and installations.

Consumers' Meters.—Capacities of, connections, testing meters and complaint meters.

Pressures.—Conditions affecting, governors, gauges, pulsations, anti-fluctuation service governors, flow computers, condensation due to compression and flow of gas.

House Piping.—Specifications for, tables of sizes.

Appliances.—Ranges and heaters, lighting and industrial.

Part III.—*General Technical Data.*—Composition, volume, specific gravity, specific heat and calorific values of gases, temperature and heat.

Steam.—Latent and specific heat, expansion, properties of and saturated steam.

Boiler Practice.—Fuels, water supply, chimneys, mathematical tables, areas, powers, roots, conversion factors.

Pipe and Fittings.—Tables from manfacturers' catalogues.

Tenth Annual Meeting, Kansas Gas, Water and Electric Association.—The tenth annual meeting of this Association was held according to announcement in the rooms of the Commercial Club, Topeka, Kas., under the presidential direction of Mr. E. S. Springer. The attendance was representative mainly of the electric lighting interests of the State, although President Springer's address dealt at some length on the gas matters of Kansas. Even here, though, natural gas received much more attention at his hands than did the artificial division of the industry. Two papers were especially well received. One by Mr. Jesse Shaw, of Topeka, on "Municipal versus Private Ownership of Public Utilities," the other, by Mr. J. C. Nicholson, of Newton, on "Electric Law." It might also be said that the presentation of "Economies of High Efficiency Lamps," by Prof. B. F. Eyer, of the Kansas State Agricultural College, was noteworthy. The Professor's communication was supplemented by a well put together series of remarks by Mr. F. W. Willcox, of the General Electric Company. The officers elected were: President. C. L. Brown, Abilene; First Vice-President, A. L. Newman, Arkansas City; Second Vice-President, W. A. Scothern; Third Vice-President, W. R. Murrow, Independence; Secretary and Treasurer, James D. Nicholson, Newton. The local entertainment committee (Messrs. A. M. Patten, L. G. Trealwen, J. T. Huntington and Jesse Shaw) saw well to the comfort of those in attendance, and the social features were well ministered chiefly through courtesy of the Topeka Edison Company and the Topeka Railway Company.

PROCEEDINGS AMERICAN GAS INSTITUTE, SECOND ANNUAL MEETING, HELD AT THE NEW WILLARD HOTEL, WASHINGTON, D. C., OCTOBER 16, 17 AND 18, 1907.

First Day, October 16.—Morning Session.

The Institute was called to order at 10 A.M., Wednesday, Oct. 16, in the convention hall of the New Willard Hotel, Washington, D. C., President Walton Clark in the Chair.

Attendance.

The following gentlemen were present:

Adams, H. C., Philadelphia, Pa.
Addicks, W. R. New York City.
Africa, W. G., Manchester, N. H.
Allen, W. H., Newark, N. J.
Allison, W. A., Philadelphia, Pa.
Anderson, W. C., Plymouth, Pa.
Aiken, H. C., Chester, Pa.
Azoy, A. C. M., New York City.
Asendorf, C., Chicago, Ills.
Ames, J. B., Jersey City, N. J.
Baehr, W. A., St. Louis, Mo.
Bailey, W. F., Wilmington, Del.
Bains, G. B., Ardmore, Pa.
Barrett. W. E., New York City.
Barrows, G. S., Kansas City, Kas.
Barthold, W. H., Saginaw, Mich.
Battin, H. S., Philadelphia, Pa.
Bayley, C. C., Washington, D. C.
Beadle, A. B., New York City.
Beal, T. R., Poughkeepsie, N. Y.
Beck, G. W. Sunbury, Pa.,
Bigelow, A. F., Allentown, Pa.
Bill, B. P., Springfield, Mass.
Boardman, A. E., New York City.
Bond, C. O., Philadelphia, Pa.
Bradley, C. W., Oak Park, Ills.
Brown, E. C., New York City.
Brown, R. B., Milwaukee, Wis.
Bruce, H., New York City.
Bullock, B.F., Fredericksburg, Va.
Bump, M. R., New York City.
Burgess, C. F., Madison, Wis.
Butterworth, C.W., St. Albans, Vt.
Butterworth, I., Detroit, Mich.
Barnes, G. W., Pittsburgh, Pa.
Barnes, W. W., New York City.
Behringer, E. A., New York City.
Bigelow, L. S., New York City.
Blinks, W. M., Kalamazoo, Mich.
Brill, A. P., Pittsburgh, Pa.
Brown, D. F., Albany, N. Y.
Buckley, J. C., Chicago, Ills.
Barnes, H. L. East Hartford, Conn.
Bache, R. P., Col. Springs, Col.
Burleigh, J. J., Camden, N. J.
Barnes, A. M., Cambridge, Mass.
Cahill, W. J., Utica, N. Y.
Campbell, S. K., Hempstead, N.Y.
Castor, W. A., Frankford, Pa.
Cathels, E., Providence, R. I.
Chubb, C. N., Sioux Falls, S. D.
Clabaugh, G. W., Omaha, Neb.
Clapp, G. N., Middletown, O.
Clark, J. A., East Orange, N. J.
Clark, J. C. D., St. Louis, Mo.
Clark, W., Philadelphia, Pa.
Clary, E. D., Burlington, Ia.
Cline, W. B., Peekskill, N. Y.
Cobb, S. P., Rochester, N. Y.
Coggshall, H. F., Fitchburg, Mass.
Collins, C., Marshall, Mich.
Collins, D. J., Philadelphia, Pa.
Coombs, R. B., Philadelphia, Pa.
Congdon, R. C., Atlanta, Ga.
Cooper, W. H., Amsterdam, N. Y.
Copley, I. C., Aurora, Ills.
Corscot, J., Madison, Wis.
Cowdery, E. G., Chicago, Ills.
Cressler, A. D., Fort Wayne, Ind.
Crisfield, J. A. P., Phila., Pa.
Crowell, F. B., Atlanta, Ga.
Cunningham, J. H., Westminster, Md.
Curran, G. W., Philadelphia, Pa.
Curtis, S. P., Philadelphia, Pa.
Carpenter, H. A., Pittsburgh, Pa.
Cartwright, H. R., Phila., Pa.
Cheesman, F. P., New York City.
Clifford, T. C., E. Pittsburgh, Pa.
Corbus, F. G., Philadelphia, Pa.
Crane, W. M., New York City.
Cressler, G. H., Fort Wayne, Ind.
Cruse, A. R., Philadelphia, Pa.
Coombs, F. S., Youngstown, O.
Causbrook, W. R., Plainfield, N. J.
Cook, C. G., Trenton, N. J.
Carter, R. A., New York City.
Dashiell, P. T., Newark, N. J.
Dell, J., St. Louis, Mo.
Dickel, C. A., Philadelphia, Pa.
Dickey, C. H., Baltimore, Md.
Diffenderfer, J E., Steelton, Pa.
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Dods, J. C., Cherryville, Kas.
Doherty, H. L., New York City.
Dolley, G. M., Peru, Ind.
Donahue, E. J., Jersey City, N. J.
Dorner, W. F., Philadelphia, Pa.
Doty, P., St. Paul, Minn.
Douglas, H.W., Ann Arbor, Mich.
Dunbar, J.W., New Albany, Ind.
Dunn, F. S., Albany, N. Y.
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Dutton, R. H., Hanover, Pa.
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Ferguson, B. B., Portsmouth, Va.
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Ferris, H. H., Jersey City, N. J.
Fitzgerald, L., Hattiesburg, Miss.
Fogg, O. H., Flushing, L. I.
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Frampton, R. C., Pittsburgh, Pa.
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Fulweiler, W. H., Philadelphia, Pa.
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Gifford, C. H., New Bedford, Mass.
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Zeek, C. F., Pensacola, Fla.
Zitzewitz, H., Chicago, Ills.

Address of Welcome.

The President—Gentlemen, in calling the Institute to order this morning, I have the pleasure of introducing to you the Hon. H. B. F. MacFarland, Commissioner of the District of Columbia, who will extend to you a welcome to the city of Washington.

Mr. MacFarland—Mr. President and gentlemen: I am very much honored in being allowed to speak a word of welcome for the executive government of the District of Columbia. I do not suppose that most of you know what the executive government of the District of Columbia is, but I may say that we are a Board of Commissioners, and that we have the general powers of a government and mayor, with some other powers of a legislative character. We are especially able to represent the sentiment of the community, and on such an occasion as this it is a united sentiment. We have human nature here, as you have it everywhere else, and we are not united upon all things, but upon the occasion of a gathering here of such a representative body as this we are absolutely one in our desire to make you feel perfectly at home. We are fortunate in that the particular arrangements for the hospitality of this occasion are in the hands of some of our citizens who know how to do that sort of thing, and I congratulate you upon being in their hands. We wish also to claim the credit for the good weather. If it had been bad weather, I should have told you that the Weather Bureau was under the National Government, but since we have good weather I claim it as belonging to the District of Columbia. We have no keys to present to you, because the gates of the city of Washington are open day and night, and because every American citizen is free-born of this city. This is your and our national capital. It does not belong to us who live here although we have a great interest in it, but it belongs to all of the citizens of the republic. It is not strange that national conventions meet here with more and more frequency. It is not strange that this is now a convention city, for there is and should be special attractions about your national capital, and, if for no other reason, because they are almost always certain to have a larger attendance here than anywhere else. Certainly, every intelligent American wants to visit his national capital at least once a year, and many of them, we are happy to say, come very much oftener than that. He ought to do it and renew his patriotism, because it exalts his just pride as an American to see the home and the symbol of the national sovereignty and of national power. In welcoming such a representative gathering as this from every part of the country, having representatives here from almost every large city, as I understand, of the country, we of the government of the District of Columbia feel that we are performing an important service to the national capital itself, for it gives us an opportunity to remind you all of your interest, and the interest of the places which you represent in this city, and to remind you what you can do to help forward its development and embellishment and improvement in every respect until it shall be, as all true Americans hope, I believe, the most perfect capital on earth. Certainly all of you know that you make the laws and the appropriations for the national capital through your senators and representatives. We believe that you want these laws and appropriations to be as wise and as generous as possible, and that you will support your representatives in Congress in order that they may aid to make Washington city, as it should be, one of the beautiful cities of the world. We who live here, we District people, pay one-half of the expenses of the maintenance of our national capital. This year we pay about $16.50 per capita, the rest of you pay the other half, and this year you pay about 6½ cents per capita. I am sure you will get your money's worth for all that you have contributed towards the maintenance of the national capital in this one visit alone. I believe you and all whom you represent would willingly double your annual contribution and make it 13 cents instead of 6½ cents, and that would add 50 per cent. to the progress of our national capital. Already it has made great progress as you who come here frequently and see it know, and as you who come here infrequently must have noticed. In carrying out the arrangements for your entertainment, you will see all possible of the city of Washington, and you will see what progress has been made in beauty and

even in wealth. It is not a commercial city, yet the United States Census Report says that we have more wealth in the District of Columbia than there is in any one of 25 specified States, so that there are only 20 States that have more wealth than the District of Columbia, and most of those States are the oldest in the Union. The resources of our financial institutions are in the neighborhood of 100 millions of dollars, which is high for a non-commercial city. We expect more wealth, although we do not expect to see it as the result of the establishment of a smoke-ridden, manufacturing city. We expect to get our increase in wealth without any decrease in beauty, but we expect also greater things than wealth. We expect a full development of beauty in our buildings and grounds, in the parks, the trees and the monuments, but we expect also greater justice in our laws and our customs, more science, more culture, more religion, so that we shall have here the ideal capital of the world. In all that we ask for the future we need and expect the aid and sympathy of every patriotic American. [Applause.]

RESPONSE OF CAPT. MCKAY.

The President—I will ask Capt. McKay to respond to the kind words of welcome by Mr. MacFarland.

Capt. McKay—Mr. President and Commissioner MacFarland: The American Gas Institute sincerely thanks you for the hearty welcome you have extended to us. This Institute is a successful consolidation of three Societies of Engineers and Managers. One of these three Societies was the American Gas Light Association. When this Association first met in Washington, 23 years ago, it came quietly and left in silence; when it again convened here 13 years ago, it arrived without welcome and escaped without arrest; when, for a third time, the annual meeting was held here in 1904, the Association was greeted by the Engineer Member of the Board of Commissioners; and behold to-day, the President of the Board of Commissioners welcomes us with kind words to the marble heart of this monumental city. We appreciate your attention, and we hope to merit the birthright of the freedom of this beautiful and magnificent place. But the scholarly form of your address reminds me of the historic visit of Queen Elizabeth to Kenilworth, when the Mayor of Coventry asked permission to present an address of welcome. The mayor, knowing that the Queen was a patron of literature, made the address poetic, and read:

"We men of Coventree
Are very pleased to see
Your Gracious Majestee;
Good Lord! how fine ye be."

But I trust that we shall not experience the sequel, for the Queen smiled, then frowned, and immediately replied:

"My Gracious Majestee
Is very wroth to see
Ye men of Coventree;
Good Lord! what fools ye be!"

This Institute, Mr. President, includes in its active membership men from every State in the Union, from Canada to the North, from America to the South, from every one of our insular possessions, and from the several nations of Europe. We feel at home here in Washington, because each one of us is more or less closely concerned with a public service corporation, and we are becoming familiar with regulation or government by commission. In these annual meetings we discuss methods and facts rather than theories; the experience and knowledge of one become the property of all; we revert to the original sources of information, and each meeting every year records a reduction in the cost of gas, or an improvement in the service, and a more careful effort to deserve and to retain the confidence and support of the people whom we serve. Great and important as it is, the gas industry is only 100 years old. Among the 16,000 words that Shakespeare used you cannot once find the word "gas;" but he knew what the future would bring forth, for he makes Clotea say, in *Cymbeline:* "If Cæsar can hide the sun from us with a blanket, or put the moon in his pocket, we will pay him tribute for light." But, Mr. President, we are come to Washington, not to demand tribute of our Cæsar, but to pay our tribute to the ineffable light of his genius. We believe with Lowell:

"As one lamp lights another, nor grows less,
So nobleness enkindleth nobleness."

Here and to Mt. Vernon we are come to learn anew the lessons of courage, of labor, and of patriotism; here, in the Capital City of our Republic, we are refreshed and inspired by the material evidence of the history, the accomplishments, the greatness, goodness and glory of our country. Again, Mr. MacFarland, the American Gas Institute thanks you for your cordial greeting, and, like the fellow-countryman of your ancestors, like Robert Burns when he was hospitably entertained, we exclaim:

"In Heaven itself we'll ask no more
Than just a Highland welcome."

PRESIDENT'S ADDRESS.

The President—The order of business now makes it necessary that you should listen to a Presidential address. I will ask Mr. Prichard if he will kindly take the chair while I am reading. [Mr. Prichard takes the chair.]

We are assembled here with the burden of proof heavy upon us. We have destroyed three of the most useful organizations of practical and scientific men that have ever existed; we have abandoned the old, simple form of organization, with the old unpretentious names; we are erecting a new and complex organization, with a name suggestive rather of confidence than of modesty. We are to determine at this meeting how we may justify the destruction we have wrought; what we may do for our industry through the new organization to justify the termination of the high class, self-sacrificing work of the American, the Western and the Ohio Gas Associations, now dead at our hands.

Seriousness becomes us at this moment. It is not certain that our industry will profit from the changes that we have wrought. It is too soon after amalgamation to congratulate ourselves on the success of our efforts. Now is the time for anxious thought and labor. With painstaking care must we work out our salvation and our justification. This is the concern of all; your directors and officers are not competent to the task. You have honored me with the executive duties of this important meeting—you have thereby increased my responsibilities, but you have not, any one of you, diminished your own. Every man who consented to the death of our old and honored gas associations must feel that personal mortification will follow failure to make this Institute a light and leading among scientific organizations, and a more than worthy successor to the honorable organizations we have destroyed. Indeed the burden of proof is heavy upon us.

Chief among the duties put upon your President and Directors is the presentation for your approval or rejection of such a plan of organization and operation as they believe will enable the Institute to do work useful to our industry and to the State and creditable to our membership. Such a plan is included in the report of the Board of Directors to be submitted for your consideration at this session.

The plan that we therein propose to you for the conduct of the affairs of this Institute is as ample as appears to us consistent with the expectation of a broader and more valuable work than that of the gas associations. This report is of paramount importance and should have your careful consideration. If you vote its adoption, and for the constitutional changes it recommends, you commit the Institute to a form of organization and a plan of work far exceeding in complexity and in extent the organization and work of the Associations we have abandoned. It is designed to effect what I understand to be the determination of the membership of this Institute, the continuation and extension of the technical work of the late gas associations, and further to so conduct the affairs of the Institute that it shall be, and be recognized as being, the authority in the United States on all questions relating to the manufacture, distribution and utilization of gas, including the keeping of accounts, and the relations between gas companies and consumers and gas companies and the city and State.

There notoriously is need of some authority in these matters, and it is possible, by the exercise of care and deliberation, to so place this Institute that it will be universally recognized as an authority to which appeals may be made, with confidence that scientific accuracy and perfect justice will characterize its decisions. The existing agitation on the subject of public service utilities, their charges and service, and the variety of laws, regulations and standards proposed by the various States, indicate the importance of some recognized authority. There can be no doubt that the American Gas Institute is the natural body for such recognition, which we can and must arrange to deserve and to secure.

Your Directors believe that the organization they recommend to you will prove adequate to this end. They are confident that under it the Institute can win and hold the confidence of the profession, and of those of our fellow citizens who, by reason of their public duties, may be brought into official relations with us. I think no work possible to us is more conducive to the good of the owners of the properties we operate and of the public we serve, and, therefore, no work that may more profitably or more honorably engage our activities. We can

and should establish standards, methods, measurements and definitions, based upon pertinent and demonstrable fact, and useful in the conduct of our business, the measurement of our service and the determination of questions at issue between the supplier and the consumer of our product. We should, as far as practicable, procure for our standards the indorsement of other technical associations and of the scientific organizations of the world. Achievement will be the result of careful and conservative effort. Let us, therefore, not be in haste to decide or to adopt; but let us consistently and persistently labor toward reasonableness and certainty. So will we achieve our purpose, and make our Institute an instrument for good to our industry, to ourselves and to our fellow citizens.

At the time of my election to this honorable office I was serving on a committee engaged on an inquiry into the operation of various public service industries, by municipalities—British and American. You have doubtless read the reports of the committee, and you will soon have an opportunity of reading the record made by the experts employed by them, and analyses of that record, written, one by the advocates of municipal trading and one by its opponents. I do not desire to discuss these matters here; but I want you to know that I come from the long investigation proud of the service American gas companies are rendering, and proud to be numbered among the operators of privately owned American gas works. We know that we have much to learn, and we know it is a poor works in which the wisest of us cannot add to his experience and knowledge, but we have nothing to fear of a comparison with the gas profession of any country, and those of us who are individualists can safely challenge the municipalizer and socialist to a comparison of results, as determined and recorded by the expert investigation of the Civic Federation. You will find that the record of the Commission bears out my statements, and fully justifies the one-time advocates of municipal ownership upon that commission in signing, as they all did sign, a report which makes no claim that municipal ownership of gas, electric light, or railways ever has been or ever will be beneficial to the consumer or to the taxpayer.

There is to-day, in many minds and places, a rage against public service companies and their servants. It is one of the symptoms—the worst—of the disease at present afflicting many of our fellow citizens—the virulent disease of demagogism. To rail at public service companies, justifying general abuse by citing particular instances of corporate evil doing, is a cheap and easy means of eliciting the applause of the unwary. Men in high places (meaning only to produce ultimate good) are not always wise enough to know that present injustice can never lead to final blessing; and we sometimes find them giving the support of their names and official dignity to the worst form of demagogy—the form that works individual injustice and spreads general distrust like a miasma over the peaceful land. Ultimately the whole people will suffer from this condition; immediately the owners of public service properties are suffering.

It appears a simple task to differentiate the good from the evil, to punish what evil doers there may be among us, as malevolent citizens, and without prejudice to the great body of honest and able men who are spending their lives, and investing their savings, in efforts to cheapen and improve the public service, and so to deserve and obtain a financial reward. We do not drag the medical profession in the mire, when we learn that some holders of medical degrees are guilty of malpractice. The short yardstick on one tradesman's counter is not accepted as condemnatory of the entire guild of merchants. We are not unreasonable in demanding that occasional corporate misdemeanors, alleged or actual, be not made the basis of suspicion of all corporations.

We who call ourselves "gas men," whether investors or operators, may assert with confidence that we are and ever have been the faithful and useful servants of the public, and that the record shows that no class of citizens, in office or not, has more honorably or more successfully striven in the universal effort to better the condition of mankind. As one result of this effort this generation has witnessed a reduction in the selling price of our product, in amount greater than is the selling price to-day. In my home city 200,000 families, whose womankind struggled with coal and ashes at the preparation of each meal served 20 years ago, now obtain their cooking fuel without labor, and at a reduced cost to the breadwinner. It is not possible fully to appreciate the social good so accomplished. This improved condition is found in every city, and our generation has not seen so great an amelioration of the condition of the urban population from any other cause. All this has been coincident with a vast extension and improvement in the service we render, and with a marked advance in the cost of nearly every element entering into the production of our product. There is no so-called unearned increment here. The reduction in the selling price has been due to the intelligent efforts of our profession to reduce costs and to extend sales. The increase in the volume of gas sold has not come alone, or in any great proportion, from the increase in urban population. It has come from the persistent and intelligent efforts of the owners and operators of gas companies to force an extension of the use of gas, partly through improvement in quality and service, but mainly through patiently developing and persistently demonstrating labor saving and money saving methods of domestic economy. Our motive, at the worst, has been no worse than the motive of the manufacturer, advertiser and salesman of any labor saving device—the money making motive; but, as I know you, I know that, while the hope of being permitted a share in the financial advantages you have created has had to do with your efforts, the realization of the beneficent character of your work has been to you a gratification and an incentive.

In view of all this, I am not prepared patiently to read and hear criticism and abuse of gas companies. I am not prepared to apologize for the part which our industry has had in ameliorating the condition of our race. I am prepared to assert that a fair division of the resulting advantage between the public, by whose consent we have our franchises, and the companies, through whose courage, enterprise and intelligence the advantage has come, would have brought to stockholders of gas properties larger financial returns than they have ever enjoyed. I believe we may reasonably hope that with the passing of present misunderstanding will come a knowledge and appreciation of our work. Having confidence in the integrity of our citizenship, we believe that the attitude of the public toward gas companies will be reasonable and well-intentioned. We must believe that legislators will recognize that the good of the people demands high class service from public service companies, and that high class service can be secured only where such service will earn a commensurate reward. Special effort and the exercise of special intelligence in the service of the public, and in the conservation of the energies of the world, which is itself a service to the public, deserve and require a special reward. The earnest, painstaking effort, the financial courage that has already made the gas supply of cities a blessing and relief to millions of housekeepers, will be adjudged an agency for good, and will be commensurately encouraged and fostered.

To aid in educating the public and their officials to an appreciation of the services and deserts of gas supplying companies is a part of the reasonable duty of this Institute. It lies largely with us to determine the attitude of the municipality and State as relates to our industry. We may place our Institute in a position of dignity and power in the world. We may make it an authority that public officials will recognize and consult to the advantage of our industry, our customers and our fellow citizens. Or we may through it continue the useful work of the old Associations and be satisfied therewith. It is ours now to decide. If we realize and utilize our opportunity to take our proper place among scientific bodies, if we prove equal to the possibilities before us, and achieve the high destiny that lies avallable to us, we will have made good in the eyes of men, and the American, the Western and the Ohio Gas Associations, of our honorable memory, will not have died in vain.

COMMITTEE ON PRESIDENT'S ADDRESS.

The Chairman—It is customary in bodies of this kind to refer the address of the President to a committee that will report later to the Association whether or not action is necessary on the recommendations he has made. If there is no objection, such usual course will be followed. Hearing none, I would name on that committee Messrs. James T. Lynn, W. E. McKay and R. B. Brown.

(To be Continued.)

[FURNISHED BY THE SECRETARY.—CONTINUED FROM PAGE 753.]

PROCEEDINGS OF THE THIRD ANNUAL MEETING OF THE EMPIRE STATE GAS AND ELECTRIC ASSOCIATION, HELD IN NEW YORK CITY, WEDNESDAY, OCTOBER 2, 1907.

MORNING SESSION.

The report of those in charge of the Association's "Publicity Work" was read and discussed, after which the Treasurer's Report was presented by Mr. Beal. This led to a lengthy discussion respecting the best way of making both ends meet, the cost of maintaining the publicity work section on its present scale furnishing matter for most of the speeches. An adjournment was ordered at 1 P.M.

AFTERNOON SESSION.

The Association reconvened at 2:30 P.M., Vice-President Macy occupying the chair. On motion of Mr. Cole the matter of going on with the Publicity Work, with items kindred thereto, was referred to the Executive Committee with power.

The President introduced Mr. Alfred E. Forstall, who read the following paper on

GAS STANDARDS:

The subject allotted to me is the broad one of gas standards, but I have understood it as being restricted to such standards of quality and pressure as are imposed by legislative or other public regulations, and have chosen to treat particularly the question of what regulations, if any, should be made in regard to the pressure at which illuminating gas should be furnished to consumers.

Apart from the necessity of overcoming the friction encountered in the passage through the mains, the only object of distributing gas under pressure in excess of that of the atmosphere is to make it possible for the gas to issue from the orifices of the burners, by which it is consumed, with sufficient velocity to enable the stream of gas so issuing to assume the shape, and draw along with itself the amount of air, required for its combustion under the conditions most favorable to the attainment of the purpose for which thb g used. Gas is consumed for a number of different purposes, and each purpose requires a different pressure for its most economical attainment.

In the field of lighting there are Argand burners, which require practically no pressure at the burner orifice; batswing burners which require a pressure of about 0.5-inch; fishtail burners, which require a slightly higher pressure than batswing, and finally, atmospheric burners which require a higher pressure than any of the luminous flame burners.

In the fields of cooking and heating luminous flame burners and atmospheric burners are also to be dealt with, the latter again calling for a higher pressure than the former. There is a very good reason why atmospheric burners require higher pressure than luminous burners, but as this reason is not always appreciated it may not be out of place to state it.

In each kind of burner the stream of gas issuing from the burner orifice by which, in the case of the atmospheric flame, is meant not the orifice at which the flame is ignited, but that through which the gas flows into the air mixer, has a certain amount of work to do and the only force available for doing this work is the energy of the issuing stream of gas. In the luminous burner the work to be done is principally that of spreading out the stream into such a shape as to permit of contact between air and gas over a comparatively wide area without any drawing of air into the stream of gas. In the case of the atmospheric burner the work to be done is principally that of entraining and mixing with the stream of gas as much air as possible up to the amount required for complete combustion of the gas. With ordinary pressures this latter amount is never reached. To so draw in and mix with gas the large amount of air required for combustion involves a greater amount of work than is necessary to simply spread out the stream of gas so as to secure surface contact between it and the air and, therefore, it is necessary that in the atmospheric burner the stream of gas should possess a greater amount of energy than is required by the stream of gas from the luminous burner. Since the amount of energy varies as the square of the velocity with which the gas issues from the orifice, and the square of the velocity varies almost directly as the pressure, it will be seen that energy possessed by a given amount of gas will vary practically directly as the pressure. At low pressures it may easily happen that the energy possessed by the stream of gas is not sufficient to draw in and mix with the gas, before the point of ignition is reached, the amount of air that is required to produce a good atmospheric flame, and this lack of energy is the reason why it is impossible to secure a good atmospheric flame with gas at a low pressure. Under the conditions existing in cooking stoves, for instance, combustion will not be complete unless the proper quantity of air is mixed with the gas before ignition occurs and when, owing to low pressure, there is not sufficient energy to draw in the quantity of air required, incomplete combustion occurs and the efficiency of the appliance is reduced. This was strikingly shown in a series of tests of gas stoves in which, in order to keep the rate of consumption of gas the same, the orifice through which the gas passed into the air mixer of the oven burner was increased in size as the pressure was decreased. Using three sides of orifice and pressures at the orifice of 0.32 inch for the largest size, 0.90 inch for the medium size and 1.38 inches for the smallest size, it was calculated that the energy possessed by the gas varied from 0.0568 to 0.2004 foot-pounds per second, the smallest sized orifice giving the greatest amount of energy because of the higher velocity. The tests showed that the consumption of gas required for a certain amount of work with the smaller orifice was only 96 per cent. of that required with the larger orifice, and that in addition there was a sufficient saving in time to make the total cost of operation 5 per cent. smaller with the smaller orifice.

In considering the subject of pressure requirements it is necessary not to forget that, while the consumer can easily reduce the pressure at which gas is supplied to his appliance, there is no way by which he can readily increase this pressure, and that, therefore, it is incumbent upon the gas company to supply a pressure that will be high enough to give satisfactory results with the appliances that require the highest pressure, even though this pressure when unregulated may be in excess of that required for the other appliances.

The tests referred to above, in conjunction with a number of others made at the same time, showed that the minimum pressure at the burner orifice which would give a good atmospheric flame in the gas stoves on the market, was about 1 inch, while still better results were obtained with pressures at the orifice of from 1.3 inches to 1.5 inches. This, however, is the pressure at the burner orifice and must not be confused with the pressure in the main, which is the subject of such regulations as have been made by various legislative and municipal authorities.

Between the main and the orifice at which the gas issues there is interposed the resistance thrown by the friction in the service and house pipes and that which has to be overcome by the gas while passing through the consumer's meter. The total loss of pressure due to these causes will seldom be less than 0.5 inch, and for old house piping systems may easily run up to 1 inch or more. In the tests already referred to, in which the pipe leading from the meter to the stove was made to conform to the conditions existing in a majority of the installations supplied by the company for which the tests were being made, it was found that the drop in pressure from the end of the service to the gas orifice of the oven burner was practically 0.7 inch. It follows, therefore, that if good results with atmospheric flames cannot be obtained without having a pressure of at least 1 inch at the burner orifice, it is necessary to carry in the street main a pressure of not less than 1.5 inches, even under the best conditions of house piping, while under the conditions often met with, the pressure in the main should be not less than 1.75 inches.

While these pressures apply for cooking stoves and ordinary incandescent burners, with the inverted incandescent burners, which are now becoming more and more popular, and will no doubt soon be very largely used, it is necessary to have a greater pressure than 1 inch at the burner orifice, and, therefore, there should be a greater pressure than 1.75 inches in the street main. Any gas company which allows the pressure in its mains to drop below 1.5 inches will be almost certain to receive enormous complaints from its consumers, and, therefore, when regulations are made fixing the pressure limits at 1 inch and 2.5 inches, the company, instead of being given a margin of 1.5 inches, is only given one of 1 inch.

The custom in establishing pressure regulations has been to fix maximum and minimum pressures beyond which the company must not go in any part of its district. It would seem, however, as if the only object of establishing regulations as to pressure is to insure that the consumers will get sufficient pressure while at the same time protecting them against excessive consumption through too high a pressure. From this point of view the only variation in pressure that is of any importance to a consumer is that between different times of the day at his particular service, and it does not make any difference to any individual whether or not there is a variation between the pressure under which he is supplied with gas and that under which another consumer some distance away is supplied. As long as the pressure is kept within reasonable limits at the inlet to any one meter it does not make any particular difference whether these limits are the same at all of the meters. For instance, if the variation at any one point is limited to say 1.5 inches it would not make any difference if the low pressure at one meter were 2 inches and that at another at the other end of the town were 4 inches. Each customer could adjust his stopcocks to suit the conditions existing at his meter, and, as long as the pressure there did not vary widely, his service would be just as satisfactory as that of any other consumer, even though the pressure in the street mains might vary considerably between the two points.

Why, then, pass laws providing that the pressures measured all over the district supplied shall not go beyond certain limits? Unless

he topography of the district is carefully studied such regulations are apt to lead to the requiring of impossibilities.

The pressure regulations imposed in 1906 upon the gas companies supplying the city of New York furnished a very good example of this requiring of impossibilities. It was found that in the Borough of Manhattan there were differences in elevation, between closely adjacent points, which were sufficient to cause differences in pressure exceeding the full range allowed by law, and when the city of New York was defending the suit brought by the Consolidated Gas Company to determine the constitutionality of the law, its so-called technical expert testified that the law should be understood as providing for an increase in pressure corresponding to increases in elevation, stating that for each increase of 100 feet in elevation a corresponding amount should be added to both the lower and upper limits of pressure so that the pressure stated in the law would be in effect only at sea level.

Another mistake made in these New York pressure regulations was that of setting the minimum pressure too low for good service, so that, while ostensibly allowing a range of 1.5 inches, the necessity of keeping above the lower limit of 1 inch in the street mains, if there was to be sufficient pressure at the orifices of atmospheric burners at the end of long house piping lines, reduced this margin to less than 1 inch. This low limit was probably adopted because it was thought that it was necessary to give a range of at least 1.5 inches between the maximum and the minimum pressures, but that the consumer would suffer because of excessive and uneconomical consumption of gas in his appliances if the upper limit of pressure was allowed to go above 2.5 inches. The belief as to the consumer suffering from a pressure in the street main greater than 2.5 inches seems to have been based upon experiments make with unchecked flat flame burners, since experiments as to the efficiency of such burners at various pressures were the only ones that were produced by either the city or the State in defending the constitutionality of this portion of the New York gas law. No one denies that if gas is supplied to an unchecked flat flame burner at a pressure at the tip of above 0.5 inch the results obtained will be uneconomical. It does not seem fair, however, to penalize not only the gas company but the consumer, who is using atmospheric burners either for light or for fuel, by requiring gas to be supplied at a pressure that will prevent the foolish, or at best improvident, people who insist upon the careless use of unchecked flat-flame burners from suffering through uneconomical consumption. As is well known to everyone in this audience, it is very easy to obtain flat flame burners that give as good results as can be obtained from any burners of this type with pressures, not at the tip but at the base of the burner, of 2.5 inches or even 3 inches. As a matter of fact is is probably safe to say that such burners are freely given out to their consumers by practically all the gas companies in the State of New York.

These low limits are, however, in direct opposition to the trend of gas distribution practice during the past 20 years. As a result of dearly bought experience the gas companies who give the best service to their consumers, and are freest from complaints either of poor service or excessive bills, have gradually increased the pressures maintained in their street mains until at present many of them are doing all that is possible to keep these pressures as near 3 inches as may be. Bearing upon this point it may be well to quote from ihe report made to the Mayor of Detroit, Mich., by Messrs. J. T. Lynn and A. B. Beadle, the experts employed to advise the city administration of Detroit as to what regulations should be passed by the Council governing the quality, purity and pressure of the illuminating gas furnished in that city:

"From the point of view of the consumer of gas, who is always entitled to a satisfactory and economical service, the amount of pressure at which the gas reaches his burners and fuel appliances, provided it is adequate, is not as important as a reasonable uniformity of pressure; for instance, a customer who can count on his gas always having a pressure of about 4 inches at times when he wants to use it, can have his gas stove burners or his Welsbach burners, etc., adjusted to work economically at that pressure.

"To get good all-round gas service in the modern house and factory using fuel appliances, the pressure at the outlet of the meter should, as a rule, be at least 2 inches of water.

"In a city the size of Detroit, having in its streets probably over 400 miles of gas mains, to get a pressure of 2 inches at the outlet of the meter of each consumer means that in many of the mains a pressure of considerably more than 2 inches must be maintained to overcome the loss of pressure due to friction in main pipes and in service pipes, and to the energy required to work the moving parts and index mechanism of the meter."

It is undoubtedly a mistake to make regulations which benefit only the unprogressive portion of the community and prevent tho progressive portion from obtaining light and fuel at the lowest possible cost. It follows from this that the provision of too narrow limits of pressure is a mistake, because the narrower the limits provided by the pressure regulations the greater must be the investment on the part of the gas company to enable it to even approximately live up to these regulations, and the greater must be the expense incurred in the way of fines for unavoidable failures to comply absolutely with them. Both interest on the increased investment and the amount paid in fines must inevitably be ultimately paid by the consumers and will, therefore, increase the cost of gas unnecessarily to all except the users of unchecked flat flame burners.

In conclusion, if pressure regulations are imposed. they should provide a low limit sufficiently high to insure good service to the user of atmospheric burners, and they should not provide an upper limit, but merely a permissible variation in the pressure as measured at different times at any point, which variation is not to be exceeded except under penalty. This limiting of variation should not apply, however, to pumping and feed mains, but if services are taken off such mains, they should be provided with house governors, which would prevent the variations of pressure in the main from being transmitted to the house piping.

The President—We will only have a short time for the discussion of these various papers, and before it is commenced I would call attention to our entertainment programme. A very kind invitation has been received from the Consolidated Gas Company for the delegates to the convention to visit the plant at Astoria. Chief Engineer Bradley stated to our Secretary that if 5 or 6 members would care to visit the Astoria plant of the Company a conveyance will be at the ferry to meet them.

No discussion offering on the Forstall paper, the report of the Auditing Committee was received, and the President introduced Mr. L. T. Palmer, of Tonawanda, N. Y., who read the following paper on

WHAT METHOD SHOULD PUBLIC UTILITY CORPORATIONS ADVOCATE AS A BASIS OF TAXATION?

No one knows better than the writer that this subject is a vast one, but one that every gas and electric company has to face *annually*, sometimes oftener; and it is the firm belief of the writer, that if every gas and electric company in the State of New York would join in a concerted movement, giving the matter the due consideration that it deserves, and place a formulated plan before the Tax Commissioners for adoption, we could gain something; for we have everything to gain and nothing to lose. The assessed valuations of our properties by our local assessors does *not* seem to be of great benefit to the Tax Commissioners, and the reports that each corporation makes to them do not seem to have any relation to the assessments, as they are passed out, arbitrarily, to each corporation. The writer at least has never seen an assessment that compared at all favorably with either his report or that of his local assessors. In fact he was told by an attorney who had called upon our own Tax Commissioners, at Albany, that they had no *unit of valuation;* in other words, nothing to guide them in making assessments upon our special franchises and tangible property in the streets and alleys. As the result of this lack of some equitable rule or method for determining value we find great discrepancies and *unfair* and *nnjust* assessed valuations. To illustrate this point, the writer knows of a gas and electric company, in a particularly thrifty city of about 30,000 population, whose special franchise assessed valuation in 1906 was $40,000, while not 20 miles away a gas company without any electric plant connected with it, doing business in a city of less than 20,000 people, was burdened with a special franchise assessed valuation of $140,000. There is to-day no *known remedy* to this evil; our only recourse is to appear upon a certain date before the Honorable Commissioners, file a complaint, and "trust to Providence" for the result. This great subject of a just and equitable taxation has never been gone after in a systematic manner, but rather has been allowed to take its own course, and the general utility corporations have simply borne their unjust burdens, while other taxpaying corporations have been able to stand in with the assessors thus getting out of paying an honest proportion of the taxes. Is it right? Is it fair? Is it fair to ourselves as general utility corporations to longer sit still, fold our hands and make no effort to correct the great wrong being continually placed upon us? We cannot raise the price of our commodity as can other manufacturers when the market changes on raw material, but to the contrary, there is constant cry and clamor for a reduction in the price of gas and electricity, regardless of manufacturing conditions. Everyone of the gas and

electric companies is paying higher wages to its employees, and more money for fuel than formerly, and still is generally lessening the price of its output. Can we not now at this meeting start a concerted movement looking toward getting equitable and fair taxation? Mr. J. J. Knight, of Kalamazoo, Mich., advocates basing our assessed valuation upon the *sales of gas*, and says, "Organized effort, intelligently applied, would doubtless result in assessors, boards of review, and State commissioners, being willing to adopt some fair uniform system of taxation."

Mr. F. W. Stone, of Ashtabula, O., says, "I have often thought that gas companies, or in fact all public service corporations, ought to be taxed on the amount of business they do instead of on their investment."

Mr. George McLean, of Dubuque, Ia., says, "Under an ideal system the public utility would be taxed by the municipality alone and on a basis of gross earnings. It would not be taxed by the township, school, county and State government if owned and operated by a municipality."

It is not the intention of the writer to formulate nor suggest any specific plan or method to be adopted at this time, but rather to get the subject before the Association, to try and have some work done looking toward an improvement in our condition.

At present we are taxed by the State, on our gross earnings, ½ of 1 per cent. This is purely a State tax. If this plan of assessment is fair, equitable and desirable for the State to base its claims for its share of our tax, why should it not be equally fair, equitable and desirable as a basis on which to assess general utility corporations in the municipalities and counties in which they do business. In addition to this, we are again taxed by our city, school and county, and the valuation for these latter taxes is fixed by the tax commissioners regardless of the rate of taxation. In some cities the rate closely approximates 3 per cent., and utility companies are compelled to pay this rate upon whatever valuation the tax commission places upon the franchises and tangible property in the streets and alleys, besides paying their regular real estate tax upon their plants proper, making the load very burdensome to carry. There is no question about the constitutionality of the State's right to tax upon special franchises, which include the main and wire systems of gas and electric companies that are in the streets, alleys or public places, but there should be some unit of value as a basis. *At present there is none.* If in the city above quoted as having the $40,000 assessed valuation, its property was in just proportion to that in the city that was assessed at $140,000, it would be all right, but such is not the case; and here comes in the trouble, for the *franchise* valuation in the city of the $40,000 *assessed* valuation is much more valuable than in the one whose assessed valuation is $140,000.

In the writer's opinion, if we could pay our taxes upon our gross earnings, then each company would stand its just proportion of the taxes. The company selling $100,000 worth of its products would then pay taxes upon that basis, and another selling one-half as much of its commodity would be *taxed* only one-half as much, whereas under our present system of assessments the earnings of a company make but little difference in the amount it is compelled to pay in taxes, as some very valuable properties are assessed much less than others not *nearly* so valuable. A property's value is its earnings, or what it can be made to earn, hence it should be taxed upon what it actually does earn, and not upon what a few disinterested commissioners may think it advisable to place upon it, whether it can afford the amount or not. These commissioners do not know the circumstances under which each plant is laboring, but they *can* know how much our earnings are, and if I earn $100,000 per year I should pay taxes upon that amount, and my neighbor earning $50,000 should pay taxes on $50.000 only; then we would have a uniform taxation, and each general utility corporation would bear *its* just proportion of the public expenses.

The writer suggests that this matter of a method for a just and equitable assessed valuation be gone into thoroughly, systematically and carefully, and when some scheme has been devised that puts the burden of taxation where it belongs in a "Square Deal" to everybody, then let us as an Association bring it to the attention of our tax commissioners, and if we have to get special legislation to bring it about, let us go after *that*, and if we who are agitating the subject to-day do not live long enough to derive some of its benefits, possibly our children may, and thus not *all* of our efforts have been spent in vain. "In Union there is Strength."

Let us be united on this, and be assured that "All things come to him who labors while he waits."

Discussion.

Mr. Gardiner—This question of franchise taxation received a great deal of attention by the Public Policy Committee of the National Electric Light Association, of which I am a member. The sub-committee consisted of Mr. Doherty and Mr. Dowd, forming the report which I have here. And by-the-way, the reports of all the sub-committees of that committee are now ready, having been received at the headquarters. The question of the conclusion was that there should be no franchise taxation; that, whatever conditions existed here and there to-day, our concerted efforts should be made to make it clear to the public and its representatives of the true effect of franchise taxation, to the end that, in the public interest, they may be abolished. If I may take 5 minutes of your time, it may be well to read this: "It is customary to assume that the entire difference between the physical value of the property and its total value is represented by its franchise value. This is not strictly true. A public service property can have a value aside from both the physical property and the franchise property, which is represented by many factors, among which are: (a) Operating organization; (b) development of business; (c) advantageous supply contracts; (d) special, general and technical knowledge of the business on the part of operators and directors; and (e) goodwill. In other words, every business, if a successful business, has a value other than its physical assets, even though this business have no special franchise, and these same values pertain to the public corporation business even though it have a franchise. Another matter that we believe represents a source of common error is the belief that the public service corporation should pay a special tax for the use of the streets. We believe that such special tax represents an unfair tax on the consumer of service in favor of the non-consumer of service. The use of the streets is practically free to everyone. The modern gas or electric company transports energy equivalent to thousand of tons of coal over or under the public maintenance without expense to the city, without interference with other traffic, without noise and nuisance to the public living along the streets, and with less detrimental incumbrance to the street than could be done in any other way. If anybody is entitled to special consideration and advantage it seems to us that the user of this service should receive some advantage over the user of other forms of energy which require transportation in a manner that encumbers the public thoroughfares and subjects other people to interference, noise and nuisance, and also subjects the streets to unnecessary and expensive wear. In street railway service the same thing is true, but in a lesser degree. The taxes imposed upon quasi-public corporations are simply shifted to their consumers, as the company's ability to lessen the cost of its service is lessened to that extent, and, in the case of street railway service, it means that the users of the cars are paying more than their fair proportion for the maintenance of the public highways. If the public cars hold on an average 30 people, it means less interference with traffic than would 30 individual conveyances. We believe that the theory of franchise taxation is in error, is against the interests of public policy, imposes burdens where they do not belong, and in the street railway business impose burdens on the poorer classes of people, whom as a rule the public wishes to protect and favor in all other methods of taxation." That is in reference to the franchise taxation in the sub-committee reports. The Bailey Committee summarized it in this form. I will read one paragraph: "Questions of taxation and franchises, which have occupied the attention of one of the sub-committees, are of great importance. We think there should be an agreement among the parties in interest upon some of the fundamental propositions which underlie these questions, particularly with respect to the subject of taxation. It should never be lost sight of that every form of taxation of public service corportions is a tax upon the consumer. While these companies should, of course, pay into the public treasuries their full share in discharge of the general public burdens, whatever is exacted from them in the form of exercises or taxes in excess of what others similarly situated are required to pay distinctly operates against reductions in charges for the service rendered or a limitation of the facilities furnished. In other words, if these public utilities must make special contributions to the public funds, it must necessarily be at the expense, in one form or another, of the particular members of the community who use their service. Inasmuch as this service is theoretically universal, in the sense of being available to all citizens desirous of using it, it should be furnished at the lowest figure practicable. The effort of every public service corporation ought to be to increase its facilities and reduce its charges as rapidly as possible, and it should not be handicapped in doing so by exactions on the

part of the public at large, which reduce the ability of the companies to do so by the amounts exacted. In other words, whatever contributions public service corporations make to the public, aside from their proportion of general taxes, should be made to those who use their service. If this simple but fundamental proposition were universally recognized, there would be an end of legislation to impose special taxes and excises upon public service corporations, whose use of the public streets is, after all, required by the public for its own convenience. If, however, it shall be necessary in particular instances to acquiesce in a popular demand for special payment for the use of public streets, the public should be educated to the knowledge of the effect upon rates and facilities which the application of such a theory involves." I trust I have not overburdened your patience in reading these extracts. Under public regulations of a thoroughly effective nature, and of a distinctly limited character as to earnings now proposed in the city of New York, the public service corporation assumes an entirely different attitude in its relations to its owners and to the public than when operating free from public regulations. It is possible for the public service corporation under this free form to make what money it can. Under a limited type of regulation the public service corporation essentially may be considered to have been pared down to what I may call a fair return on only the investment. Under such circumstances the corporation has really in a sense assumed or has been forced into the position of being simply an agent of the public. From that it is extremely easy to define the proposition laid down by the public service committee, to the effect that all imposts or taxes on the public service corporations are merely direct burdens on the users of service. Personally I urge a publicity campaign to establish these ideas in the mind of the public rather than to seek to get some equitable method of taxation, but I do not advocate the latter, for franchise taxes are wrong, in my opinion, in themselves.

Mr. Beal—Mr. Palmer's paper on this subject is interesting to all. Mr. Gardiner in his answer has given a splendid presentation, and should in a way form our book on the subject, as I understand it is the report of the public policy committee, and it is now available having been put into print. I suggest if available to circulate it among our members if it meets with the approval of this Association. There is just as much reason for the State taxing the public service corporations to-day as there is for its taxing itself or taxing municipalities. It seems to me we should make efforts to get this form of tax abolished. Mr. Palmer advocates a tax on the gross earnings. That does not meet the situation. If we could only get this presentation of the whole subject before our members and let them preach it and teach it in their respective community, it would be an educational influence which we are associated to get the benefit of.

Mr. Sheehan - One aim we should attempt to attain in this matter of franchise tax is the removal of the power from the tax board to assess the tax. There should be no other board dealing with the matter of assessments. In the last 2 weeks that Board has sent to the municipal authorities in two places requests for answers as to two different corporations, just the same as they propound questions for us making up our report. In one of these cases the company was in difficulties with the municipality, and there was no knowledge conveyed to the company of the fact that such questions had been asked or answered. Presumably the answers were to be detriment of the company. In the other case the municipality was willing to make a proper return to the company. Now, the only source of information the tax board had of the values of those two properties was such as it got through the munici pal authorities. We should bring such pressure as we can bear upen the Legislature to remove this power from the board and to bestow the power on the Public Service Commission.

Mr. Palmer—The gentlemen present last evening heard what Mr. Henry J. Pierce, of Buffalo, said in relation to street railway franchise taxation. The Street Railway Association would probably like to join with the Empire State, and the National Electric Light Association would be glad to join them, in trying to get through legislation to have that done. He said that they had to lower wages in order to live. I suggest in going into this that we should ask the street railway and other public utility corporations to join with us.

The President—I think that committees should be appointed to look into this new field.

Mr. Beal—I would like to suggest that we have a standing committee appointed on the subject of taxation. One thing they should do is to bring about a change in the date of the tax reports. I think that alone is a very important subject. We now have covered the gruond twice, as someone has suggested.

The President—Do you make that motion?

Mr. Beal—Yes, sir; I move that the Chair appoint a standing committee of three to investigate the subject of taxation of franchises. [Motion seconded, stated and carried.]

(To be Continued.)

[Concluded from page 760.]

FIFTEENTH ANNUAL CONVENTION, PACIFIC COAST GAS ASSOCIATION.

Held at Santa Cruz, September 17, 18 and 19, 1907.

Closing Session.

The President announced that Director George H. Hollidge had arranged an excellent display of "Novelties," the inspection of which had been of great interest to the delegates. He then proceeded to read the paper on

LAMPBLACK,

which was a "composite production," several members having assisted in the compilation.

[For the text of the paper, see Journal, Oct. 7, p. 620.]

The discussion on this topic was carried on at some length, and, after considerable routine business, the meeting was declared ad journed.

Other papers read at the meeting are appended.

Sulphur and Oil Gas.

By Mr. P. W. Prutzman.

Sulphur is one of the most widely distributed of the elements, and is found in every portion of the earth's crust, often in considerable quantity. It occurs native in enormous deposits, and is found in some proportion in all metallic and in many non-metallic minerals. It is an essential constituent of almost all forms of plant and animal life, and is found in appreciable quantities in all but the purest air and water.

It is, therefore, not surprising that it is found in more or less quantity in all organic minerals, such as petroleum, coal and peat, and as it passes readily and almost completely into the gas made from these substances, and its presence in the gas is highly detrimental, its removal from the raw material and from the crude gas has engaged the attention of the fraternity from the earliest days of the industry.

Pure sulphur, while occurring in several forms, has in all the same chemical properties. It is one of the most reactive of the elements, combining directly with air, moisture, many metals and with a large part of the known hydrocarbons. With hydrogen, sulphur combines to form hydrogen sulphide, a combustible gas, very soluble in water, and with a very foul and nauseating odor. The compounds of sulphur with the hydrocarbons resemble hydrogen sulphide in their main chemical properties, but are much less soluble and less reactive with chemicals. They are combustible also, range in physical properties from a light volatile liquid to a heavy, high boiling oil, and display every degree of stench known to science or uncleanliness.

Free sulphur and all its combustible compounds burn at a very low temperature, in the presence of oxygen, to sulphur dioxide. This is a gas, soluble in water, of strong acid reaction, suffocating and irritating when breathed, but not poisonous. In itself it is not objectionable in the quantities produced from the burning of very bad gas, unless at times in a very close room; but, unfortunately for the gas maker, sulphur dioxide in the atmosphere rapidly unites with water, producing sulphurous acid. This again takes up oxygen from the air, forming sulphuric acid. As is well known, this is the most caustic and corrosive of acids, poisonous in quantity, attacking metals, discharging the colors of dyes and pigments, and destroying the strength of all fabrics except those of wool. It is to the formation of this acid from the combustion products of sulphur bearing gas that practically all the bad effects are due, as, while hydrogen sulphide blackens metals, and is probably detrimental to health to some extent, the cases where notable amounts could escape unburned are rare.

Petroleum is a very complicated mixture of similar and dissimilar bodies, and as such sulphur is not at all an essential constituent, though it is seldom that an oil is found free from it. This is probably due to the fact that oil producing regions are usually centers of geological and chemical activity, and in such free sulphur is always present in the earth's crust, and usually in considerable, though highly variable, amount. As sulphur is freely soluble in oil, and also combines with it readily at low temperatures, it is evident that

the presence of free sulphur in any portion of the earth within the radius from which the well draws would account for a sulphur bearing oil. In some parts of Texas, where the oil is produced from heated strata carrying enormous percentages of sulphur, oils are found so thoroughly saturated that sulphur crystallizes out on cooling.

The behavior of petroleum with sulphur seems to depend largely on the general chemical constitution of the oil, and no definite rules can be formulated in the present state of our knowledge. Some oils carry their sulphur principally in the free state; that is, in mere solution, as sugar might be dissolved in water. Others carry large amounts of sulphur very firmly combined, in the form of mercaptans, etc., these oils being very refractory in the refinery and about equally so in the gas works. What differences in condition lead to these varying results we do not know. When sulphur, as such, is mixed with a sulphur free oil, in the cold, it merely goes into solution. If the temperature of the solution be increased, the sulphur appears to go into combination between 300° and 400° F., taking hydrogen from the oil to form hydrogen sulphide, which is given off, and leaving a residue of asphalt or of free carbon as the case may be. Ordinarily the reaction is complete at about 400°, if sufficient time is allowed, and as a rule very little or none of the sulphur remains in the residue. But on heating an oil containing considerable combined sulphur, the compounds break down only at a much higher temperature, usually 600° F. or more, and then not completely to hydrogen sulphide, but partly to lighter mercaptans, while a portion appears to distil over unchanged.

The import of this difference to the gas maker may not appear at first sight, but it is very real nevertheless. Hydrogen sulphide is a gas which is very soluble in water, and can be largely removed in the scrubbers without the use of excessive amounts of water. On the other hand the mercaptans are present in the gas as vapors of liquids, which are not particularly soluble, and while a portion is held back by the condensers a considerable amount passes forward to the scrubbers, where it can be removed only by long continued washing. As this is not only expensive of itself, but has a strong tendency to degrade the candle power, the objections are evident, and in fact in most cases the amount of scrubbing and the temperature of the water used must be determined by other considerations than the effect on the sulphur percentage.

It is here that one means of relief for the purifiers is suggested. If any way can be found by which the percentage of combined sulphur in the gas can be decreased, with a corresponding increase in the proportion of hydrogen sulphide, a gain is made. For while, as stated the completeness of removal of the mercaptans will vary with the time of scrubbing and the temperature of the water, and directly with the original percentage of mercaptans, in the case of hydrogen sulphide the completeness of removal will, on account of the ready solubility of this gas, vary only with the temperature of the water, and be very little affected by the time of scrubbing, and almost none by the amount of original impurity. This last point may be made clearer by a homely illustration. Suppose that some one should pile an inch of flour on one side of the brim of your nice, black hat, and a sixteenth of an inch on the other side. It would be no more trouble to remove the inch than the sixteenth, but you would find the removal of the last traces a matter of some difficulty in either case.

When we pass the gas to the scrubbers we find the same difference. Hydrogen sulphide is readily removed by the usual treatment with lime or oxide, while the removal of the mercaptans is much slower, requiring more time and purer chemicals. Even then it is doubtful if any method of purification in present use is able to entirely remove the mercaptans in any practicable length of time. The addition of caustic soda, sprayed onto the purifying mass, has been suggested, though whether it has been tried, and if so with what results, I do not know. Soda is used for this same purpose in oil refining, but only after the oil has been acted on with strong sulphuric acid, and it seems very likely indeed that in this case the sulphur compounds are first converted into sulphonic acid or similar bodies, which have a strong affinity for alkalies. If this be true the analogy would not apply, as of course an acid treatment for gas is out of the question, the best part of the illuminants being soluble in sulphuric acid. On the whole, considering the cost of purification and the great increase in size of plant attending any lengthening of the time of contact, I consider it very doubtful whether any progress toward a solution in this direction is possible.

We are left, then, with four directions in which aid may be sought. The first would be, where any choice is practicable, to select the oil containing the least sulphur, or, as between two oils of the same gross percentage, that containing the most free and the least combined sulphur. The first test is simple and easy enough; analysis alone is the safe guide, and every purchaser of crude for gas making should be equipped to make this simple test. Oils vary greatly in sulphur content in different fields, and while averages for the fields could be given they would be of little value, as individual wells in one district vary as greatly as the fields' averages. As to the relation between free and combined sulphur, no such royal road is laid down. The method of testing outlined below gives good general ideas in the hands of a trained operator, but these results cannot be reduced to figures and depend largely on the manipulator's judgment.

Having first determined total sulphur by the usual method, the samples to be compared are slowly distilled from glass flasks, having side necks but no jackets. If sulphur collects in the neck of the flask while water is distilling over (*i. e.*, at about 250° F.), or if much hydrogen sulphide is given off below 400° F., considerable free sulphur is indicated. If little or no hydrogen sulphide is formed between 400° and 600°, a considerable amount at or above the latter temperature indicates a large proportion of combined sulphur and an oil likely to run to tar or lampblack, while free sulphur forming in the neck of the flask at this temperature indicates the same as regards combined sulphur, but points to an oil likely to require high heats in fixing. Of course these results are very general, and they give no information at all on the most important point, that of the comparative ease with which the mercaptans will break down in the machine. A really practicable and fairly accurate test to this end would be of great value where there is any choice of oils, and such could undoubtedly be worked out with time and patience.

If we eliminate overscrubbing, which is undoubtedly effective, but usually limited by other conditions, our last resource is in the manipulation of the gas making apparatus. The sulphur compounds of petroleum show a strong tendency to break down to hydrogen sulphide and carbon at moderate heats, but this change takes place slowly. It is accelerated by contact with highly heated rough-walls or baffles, but here we meet the limitation that the conditions most favorable to the destruction of the mercaptans are also those most favorable to the production of naphthaline and loss of candle power. This is a phase of the question on which I am not competent to dwell; it may be that there are prospects along this line, though I am not able to see them.

Many suggestions have been made looking to the removal of sulphur from the oil before use in refining or gas making, but with one exception these seem to be based on a misunderstanding of the conditions. Not only is the bond of union in these sulphur compounds a very firm one, but the affinity between the oil and the sulphur is such that any free sulphur will attack the oil before it will unite with any other substance, with the possible exception of caustic alkalies. As these would rapidly destroy heated firebrick, there seems to be little hope of finding any substance which, being added to the oil before use, would fix the sulphur and prevent its being carried forward into the gas.

As to attempts to wash out the sulphur, a glance at the physical nature would show that such attempts must be abortive. Aside from the fact that no other chemical than strong sulphuric acid has yet been found which will wash out any material portion of the sulphur from oil, the difficulty of removing the washing materials, due to the viscosity of the oil, and the time and plant investment required for mixing and settling, put such means entirely out of the question.

The only method of this character which seems to offer any hope whatever of success is simple distillation. By slowly distilling the crude a large portion of the sulphur is either carried away in the gas which accompanies the distillation, or left behind in the asphalt, and by a simple modification of the usual process a distillate may be had which is practically free from sulphur. The cost of this distillate would, of course, depend on the scale of operations, the market and relative price for asphalt and other factors. In no case should the distillate cost more than a few cents a barrel more than crude, and under favorable circumstances there might even be a profit in the distilling operation, so that, while the initial investment would be considerable, yet in cases where the process permits the use of distillate to advantage, and where purification has become a serious problem, there might be some advantages in this method.

One Year After.

By Mr. George C. Holberton.

Mr. President and Fellow Members of the Pacific Coast Gas Association: Last year Mr. L. E. Reynolds told you how electricity was served to the consumers and street car lines by the San Francisco Gas and Electric Company immediately following the fire, and I thought perhaps you might like to hear something of the results of this work and the experience which we gained and also something of what has been done since that time. Mr. Reynolds described to you in his paper the system existing at the time of the fire and what was installed immediately thereafter. There have been no practical changes or deviations from his description, except that our sub-station, lying

between Bush street and Fern avenue and between Larkin and Polk, has been rehabilitated, and we now have a very substantial concrete sub-station. No other sub-stations have been rehabilitated, although we have one at Mariposa and Kansas street which is nearing completion, and we are still using temporary sub-stations which were installed at First avenue, and at Seventeenth and Folsom streets, as well as the station near Third and Townsend, and the old Kansas street sub-station mentioned by Mr. Reynolds.

After the first troubles were over, and after some of the consumers, whose buildings were not injured, were again supplied with current, the next problem that confronted us was that of supplying the temporary retail merchants, also temporary offices, saloons, etc. This was really much more of a problem than would at first seem, and was one of the most difficult for the reason that the entire business of San Francisco was picked up, so-to-speak, from its old location and put down again on Fillmore street and Van Ness avenue, a territory too far removed from the old centers to enable us to use the existing system; also, the load became so congested on Fillmore street that there was actually insufficient room on the pole lines to hang enough transformers to take care of the load. Neither was it always possible to install transformers on the side streets off Fillmore street, as the copper required would be too heavy to string on the poles. We were, therefore, obliged in some cases to build vaults in the streets wherein we placed our transformers, and then take service direct from the transformers to the heavy loads, and at the same time run a pole rise from this vault into our secondary network. In addition to this difficulty which we experienced, the operation and maintenance department also had, of course, great difficulty in taking care of this sudden increase of load with the small amount of apparatus which was not destroyed by the fire, and which could not be increased owing to the time required by the manufacturers and the time required for shipping. The straits to which we were put may be illustrated by stating that we even went so far as to express our power house transformers out by special cars.

The favorite evening occupation of the officers of the corporation during the evenings preceding the holidays and during the holidays was to ride around in automobiles, inspecting lights and passing out the "glad hand" to consumers, telling them of the things which we were going to do to better the service, and showing them how much brighter their lights were than the week before, at the same time praying that they would have time to leave the building and get into their machine before the lights went out. However, we did manage to pull through the holidays after a fashion, and by that time we began to receive additional apparatus from the East, which put us in pretty fair shape to handle the load as then existing. After that there were some few large installations in the way of theaters, such as the Orpheum, etc., which were built in the vicinity of Fillmore street, but which were sufficiently removed from that thoroughfare as to give us room on our poles to hang the necessary transformers.

For some months at the beginning of the present year the gain in consumers was enormous; this was also true during the fall of last year. As I recall the matter, when I came to San Francisco in September, it was not uncommon for us to have outstanding from 1,500 to 1,600 electric orders, the bulk of which were connect-and-run service orders. After the first few months of this year the demand seemed to fall off. People were then somewhat discouraged at the existing conditions and building operations seemed to slack off materially, so that we ran as low as low as 300 tags uncompleted at one time, which, deducting those that it was impossible to finish, meant only 2 or 3 days' work. For the last month the conditions seem very much more active, as though people had taken fresh courage, due to more fixed conditions, and were again rehabilitating in the old districts, which entailed a large amount of work for the crews and meter setters, but fortunately it does not require a corresponding increase of work for the construction department, due to the fact that the large office buildings being built occupied a territory where our original system existing prior to the fire is still intact. Still it does entail a large amount of work in the stations and sub-stations to handle this fast increasing business. As an illustration of the amount of this, I would state that, in the month just passed, the San Francisco Gas and Electric Company alone, exclusive of the other Companies, has added to the installed load 31,000 lamps of 16-candle power, and an increase in power load of about 1,500-horse. Although this is a very large increase I do not think it is anything like as great as we will have in the next few months, provided conditions in the city remain as at present. From this you will see that, although it is now 17 months since the fire, our conditions are still abnormal.

After the first difficulties were overcome we again examined our system more in detail, and then found many surprising conditions that were not apparent on the surface. In some localities the settlement of the street was very great so that the conduit lines were broken; the ends setting away from each other so as to make it impossible to rod the ducts. One of the worst places was in the vicinity of the new Post Office Building, where Mission street had settled so much, as you have probably noticed in the illustrated periodicals.

Another source of expense and trouble was the changing of the street tracks. The United Railroads did an immense amount of work in many cases obtaining new grades from the city, which meant the raising of our manhole castings. Then too, as they began to clear out the debris from the basement of building sites prior to rehabilitation they had a pleasant way of piling this on top of our service holes, which they would generally succeed in doing just as the man across the street made application for current, which necessitated our getting into that particular service hole. Another pleasant circumstance we had was with the method of construction as employed by the United Railroads in the removal of the old cable tracks. They would take one track at a time and blast this out during the night, which generally resulted in shaking up our underground system pretty thoroughly, and for fear that they might notshake it up altogether they would come along the next day on the track which was not blasted out and with a derrick lift those immense concrete blocks and carefully stack them up as high as they could, principally over our Edison mains. This generally meant that the main would be broken, as well as most of the windows in the neighborhood, and at the same time it was physically impossible to replace or even find the exact location of the burned out tube. In some cases we were put to the extremity of taking the cable out of the manhole and running it along the curb with a box over it and into the next manhole beyond the trouble, the ends of this cable being connected to the Edison mains at either side of the break.

One of the most pleasant spots that we are obliged to tackle now is lower Market street. There are four railroad tracks at this point, with two outer tracks varying from a few inches to 4 feet 6 inches above the inside track, the outer tracks being now in process of construction, this of course with the usual amount of material and debris being piled in the street. Then, to help matters along, the city and county of San Francisco are building two sewers on the same side of the street in whatever position it pleases them, we to make the best of it and move our system accordingly. To help along still further, the Home Telephone Company, the City Electric Company, the Postal Telegraph Company, the Department of Electricity and the United Railroads are all building duct lines in the lower end of Market street, the Spring Valley Water Company is repairing the large water mains, the Gas Company is repairing its mains, the Mutual Electric Company is fixing up its conduit system and the city is putting in new culverts, and incidentally the property owners on the side streets, feeling that they should do their share toward the upbuilding of lower Market street, are taking advantage of the fact that the grade is to be raised 4 feet 6 inches, and are piling all the debris, bricks, iron pipe, crockery, etc., on top of the various systems above referred to, generally a few feet ahead of where we are to put a duct.

If the members are anxious to see a really pleasant mix up, I would earnestly invite them to inspect lower Market street. This, gentlemen will, I think, give you some little idea of the troubles that the electric distribution department is having at the present time, and I do not know of anything else that we need to make their troubles more pleasant than perhaps a few good rain storms to turn the present dust into a nice, healthy mud.

Short Topic: Heat Units.

By Mr. Fred. C. Jones.

The calorific value of combustible gases is always expressed, at least in this country, in British Thermal Units per cubic foot, the British Thermal Unit being the amount of heat necessary to raise the temperature of 1 pound of water 1° F. Each combustible gas has its own definite number of thermal units, depending upon, and as unchanging as its chemical formula. Each combustible gas requires, moreover, a certain definite volume of air for complete combustion, this volume depending upon the chemical composition of the gas. That is, the more complex the gas the richer it is in carbon and hydrogen, and the greater will be its number of thermal units per cubic foot; but the greater also will be the amount of air required for the development of these thermal units. A closer study of the re-

lation of thermal value to air required reveals a singular and interesting fact—we might say, law: Equal volumes of all perfectly combustible mixtures of gas and air contain the same number of thermal units. For example, a cubic foot of hydrogen contains 344 B.T.U., while a cubic foot of methane contains 1,073 B.T.U. For complete combustion of 1 cubic foot of hydrogen, 2½ cubic feet of air are required, while for methane 10 cubic feet of air are required. That is, while we must dilute the cubic foot containing 344 B.T.U. to a mixture of 3½ cubic feet, we must dilute the cubic foot containing 1,073 B.T.U. to a mixture of 11 cubic feet; dividing 344 by 3½, and 1,073 by 11, we find we have almost the same result; that is, a thermal constant of 100. It is evident, therefore, that the sum of a unit of gas, plus the number of units of air required for complete combustion, multiplied by 100, equals the B.T.U. per cubic foot of the gas.

British thermal units, then, may be determined experimentally in a very short time. In an explosion burette take 10 c.c. gas under examination, add an excess of air for combustion, say 70 c.c., explode, cool and read the amount, so that after passing into the phosphorus pipette the excess of oxygen may be read. Say this excess was 2 c.c., the excess of air, then, in the mixture was 10 c.c. The 10 c.c. of gas, therefore, required 60 c.c. of air instead of 70 c.c. In other words, 1 cubic foot of this gas requires 6 cubic feet of air for perfect combustion, making 7 cubic feet, each cubic foot of which contains the thermal constant 100; 7 by 100, or 700, is the amount of B.T.U. contained in this cubic foot of gas. Practice has confirmed the correctness of this law, although, if the B.T.U. were under 100, as is the case with lean producer gas or blast furnace gases, this law will not apply.

Although there are cases in which this method does not hold, leading me to think that the thermal constant has not properly been determined, still the object of this paper has been attained if a step has been made in the right direction.

[Communicated.]

Window Lighting.[1]

By Van Rensselaer Lansingh, Illuminating Engineer.

There seems to be more or less difference of opinion to-day in the gas field as to the proper methods of lighting show windows, and the object of this paper is to throw some light on this rather hazy subject. In the first place, window lighting can be divided into two classes: First, those where the primary object is to properly illuminate the goods displayed; second, those where the principal reason is to attract attention to the place itself rather than the goods, such as saloons, etc. This article will consider only the former case, which comprises the vast majority of store windows.

Such store window lighting can be roughly divided into three general methods: First, windows lighted by gas arcs placed over the sidewalk; second, gas arcs, upright or inverted burners, placed within the window where they can be seen from the sidewalk; third, any form of gas burner placed within the window and entirely concealed from view.

It is generally recognized to-day that it should be the policy of a gas company to give its customers the maximum illumination for the least expenditure of gas, so that the method of lighting windows advocated by gas companies should be from this standpoint rather than that of giving the customer devices and methods which will consume the maximum of gas, irrespective of their lighting values. If this policy had been carried out in the past as it is to-day, perhaps we would have far less of municipal ownership, public regulation, etc.

Lighting by Gas Arcs.—The method of window lighting, by placing gas arcs in front of the windows and over the sidewalk, has been well brought out in an article by "Engineer," entitled "Bright Store Lights," in the August 19th issue of the American Gas Light Journal, and in order to study this method it may be well to analyze this article in detail. Briefly, his idea is to light a window, as is shown in Figs. 1 and 2, which are reproduced from his article.

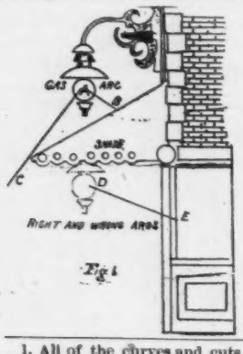
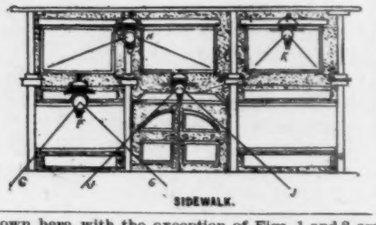


Fig. 2.



1. All of the curves and cuts shown here, with the exception of Figs. 1 and 2, are reproduced by permission from "Practical Illumination," by Messrs. Cravath and Lansingh.

This suggestion is not, however, new. Years ago this was a common method of store window lighting with electric arcs, and even to-day one finds at rare intervals examples of such electric lighting. Generally speaking, however, this has been entirely abandoned by the electric lighting companies, and it is, therefore, much to be regretted to see such a backward step being recommended by the gas engineer. The only justification for such an attitude that the writer can see is that it avoids sweating of the windows, which is liable to take place if lights are placed inside, but this, of course, can be overcome without having recourse to placing the lights in the street.

In order to bring out clearly the fallacies in such recommendations, let us consider the subject from the standpoint of the illuminating engineer, for surely this is a problem which clearly lies in his jurisdiction. Fig. 1, reproduced from "Engineer's" article, shows clearly, as he points out, that we must lower the arc so as to get rid of all chances of an awning cutting off the light, and also so that the rays of light will fall on the goods. If this is done the lights must necessarily shine into the eyes of observers on the opposite side of the street or from a passing car, so that their eyes are partially blinded and the ability to see the goods clearly much lessened. With electric lighting they tried to overcome this difficulty by blackening the side of the globe facing the street. This, of course, could have been still more improved by first giving one side of the globe two or three coats of white paint and then an exterior coat of black, all of which, however, is botch work and entirely unnecessary.

If the lights were entirely concealed from view the eye could work with a wide aperture and receive all of the light reflected from the goods displayed. With bright lights in the field of vision, however, we lose in two ways. First, the iris or pupil of the eye closes as much as possible and, therefore, less light from the goods displayed falls on the retina. Second, the eye judges by contrast, and since a bright light in the field of vision is so much more brilliant than the light reflected from the goods, the latter seem dim and poorly lighted purely from contrast. Of course, with persons directly under the lights they escape this trouble, but we have to light for persons on both sides of the street to get the most value. So much from a physiological standpoint.

From an economical standpoint, the results are just as bad, as not over 15 per cent. of the light from the gas arc falls on the window and a fair percentage of this is reflected back by the window pane. Take, for example, the window shown in Fig. 2, taken from "Engineer's" article, and consider the arc *F* the most favorably located. We will consider the case of a 4-light gas arc which has been carefully tested.

Fig. 3 shows the horizontal distribution of the arc and Fig. 4 its

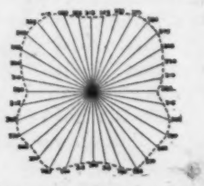


Fig. 3.—Horizontal Distribution of 4-Light Gas Arc.

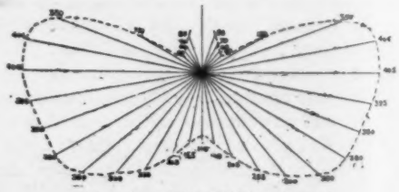


Fig. 4.—Vertical Distribution of 4-Light Gas Arc.

vertical distribution when equipped with a large reflector. If we assume that the light is placed 4 feet in front of the window, which is 6 feet high and 10 feet long, and the center of the light is at the top of the window, we will find that, even when a good reflector is used, only 15 per cent. of the total flux will strike the window, and of this a good deal is thrown back, due to the reflection from the window, so it is safe to assume that, except in very special cases, we never receive more than 10 to 12 per cent. of the light on the goods displayed.

It may be well at this point to call attention to the exceedingly lax method of designating how light is thrown, as drawn in Fig. 2, taken from the article quoted above. The same arcs are shown as throwing the light at different angles, evidently intending to convey the impression that the lights are just right for the place. Inasmuch as it is possible to-day to get reliable photometric curves of almost all different kinds of gas illuminating appliances, it is to be hoped that more exact methods will be used in the future in technical gas articles, the same as are now customary in the electric field.

Of course, on the other hand, it can be said that the gas arc is a good advertisement and attracts attention to the store, but if one really studies the question, taking a few examples from the electrical field, it will be quickly found that the store windows which attract the most attention are those in which all the lights are entirely con-

cealed from the eye. There is sufficient light reflected from the goods in the window to the street to attract all the attention necessary. The policy of placing lights in store windows where they can be seen is even now rapidly passing away.

Concealed Lighting.—If the above statements are true, the question then arises as to what are the best methods of lighting a window with gas. Owing to the space necessary to carry off waste gases, height of chimney, etc., the upright burner is hardly adapted, except in special instances, for good lighting, but fortunately the inverted burner at this point offers a remarkably good solution. To begin with, no less than 67 per cent. of the light from an inverted burner is below the horizontal, as is shown in Fig. 5.

If we use with such a burner suitable reflectors made of mirror, opal or prismatic glass, this percentage of light thrown below the horizontal can be largely increased, and at the same time proper reflectors can be selected to give the proper distribution. Thus, Fig. 6 shows the light distribution of the same burner shown in Fig. 5, but equipped with an 8-inch deep-cone, porcelain reflector, and Fig. 7 the same burner, with a concentrating prismatic reflector.

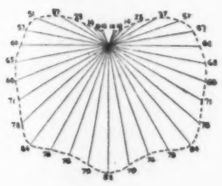


Fig. 5. Curve of Bare Inverted Burner.

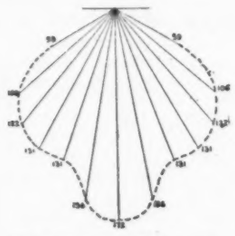


Fig. 6.—Curve of Inverted Burner with 8-inch Porcelain Cone Reflector.

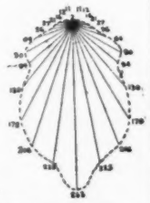


Fig. 7.—Curve of Inverted Burner with Prismatic Reflector.

In this case 86 per cent. of the light is thrown downwards, the end-on candle power being no less than 263. This burner was consuming 3 cubic feet of gas per hour, and the results should be compared with the gas arc shown in Fig. 4, consuming 21 cubic feet of gas per hour.

By placing properly equipped inverted lights close to the front of the window, as high as possible, where they will be out of the field of vision, the objection to shadows due to lights being placed back of the goods displayed is entirely overcome. Moreover, if in such cases either an opal or prismatic reflector is used, it is possible to obtain an illuminated sign from the same. A dark strip can be painted across the upper part of the glass and the letters giving the man's name or business can be left translucent, so that the light which passes through the reflector will illuminate the letters, giving all the advantages of an illuminated sign without any additional cost.

If the height of ceiling permits, the scheme can, of course, be adopted with the gas arc by properly equipping it with suitable reflectors. In this case practically all of the light is thrown on the goods, whereas in the case cited by "Engineer" not over 10 to 12 per cent. falls on the goods.

Figs. 8 and 9 show examples from the electrical field of poor and good lighting effects. In Fig. 9, owing to the bare lamps placed in the field of vision, it is practically impossible to see the character of goods displayed in the window, while in Fig. 8, although about half the amount of light is used, the goods stand out plainly, and the eye is not at all dazzled, owing to the fact that all the lights are concealed.

Fig. 8.—Window Lighted to Display Goods.

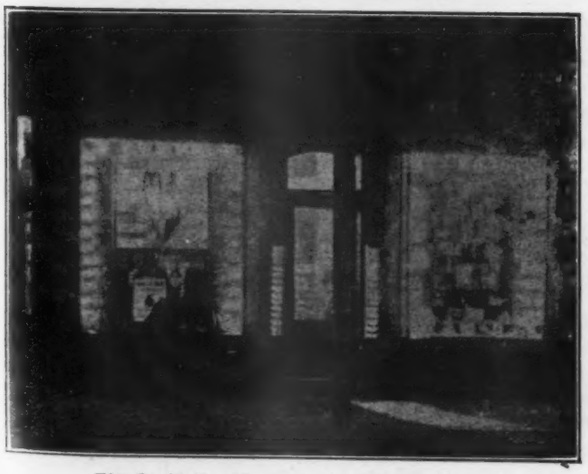


Fig. 9.—Binding Effect of Border Window Lights.

Main Points of Interest in the Decision of the Wisconsin State Railway Commission in Respect of the Application of the La Crosse Gas and Electric Company for the Right to Charge Higher Rates.

We are indebted to Mr. D. MacMillan, President of the La Crosse (Wis.) Gas and Electric Company, for the following, respecting the Order of the Wisconsin Railway Commission in the instance of the application of his Company for a readjustment of the scale of rates that may be charged on electrical account in that city. The Order, in effect, sustains the contention that the rates in force are unremunerative, and is a notable example of good legal sense that administers fair play.

The decision is exhaustive and lengthy, for its arguments and findings cover 37 pages of typewritten matter. To begin with, the business futility of attempting to maintain competition in the lighting field is nicely brought out, and the history of the protracted, wasteful struggle between the competing Companies is reviewed, in fact all the various forms of charges are gone into in detail. The interesting statement is made that instead of paying excessive rates for light, the 1½-hour customers are getting their lights at a loss to the Company, while this is almost true of the 2-hour customers. Under the city ordinance, which limits the charge to 10 cents per 1,000 kilowatts, the Commission declares it was impossible for the Company to make a profit upon the class of business served for short hours.

Review of the Case.—Referring to the institution of the proceedings just concluded the Commission says: "The petition is dated August 6, and the hearing in the matter was held August 16 last. At this hearing the petitioner was represented by D. G. MacMillan and by P. M. Gelatt. The people of La Crosse were not represented. The mayor and the city attorney and other officials of that city were duly notified of the proceedings and of the date of the hearing, but they informed the Commission that no one representing the city would appear. In the correspondence in the matter which we have had with the mayor, he stated: 'While I do not think there is any desire on the part of the city to object to a temporary restoration of the rates for the electric current as provided for in Sec. 4 of Ordinance 348, I am of the opinion that there would be objections to the readiness-to-serve schedule.' He further stated that within the past 2 years, and previously to the election of the President, who is now in charge of the business, the La Crosse Gas and Electric Company in a circular letter had attacked the 'readiness-to-serve' system stating that it meant 'paying something for nothing.' The mayor also furnished us with the assessed valuation of the Company, and later the mayor and city attorney called on the Commission in relation to the petition.

The Issues Involved.—"From the above petition and from the testimony and facts presented in the matter, it appears that the issues involved in this case may be stated about as follows: Are the rates now charged by the La Crosse Gas and Electric Company for electric lighting, and which were made the lawful rates by Chapter 499, laws of 1907, unreasonably low; and if so, what rates should be substituted for the rates now charged?

"The testimony and facts presented by the petitioner relate mostly to the history of electric lighting in La Crosse; to the character and capacity of the electric plant; to the earnings and expenses of the Company for the past 5½ years; to the assets and liabilities for the same period; to the rates now charged; to the rates which the Commission was asked to establish; to the various systems of fixing rates that are now in use; and to many other qnestions that are involved in this case.

Competition a Failure.—The Commission then goes into the history of electric lighting competition in La Crosse. The history of the lighting business here from the time the La Crosse Gas Company obtained a charter in 1856, until the retirement of the Wisconsin Light and Power Company from the field in 1907, is covered at length. The situation in La Crosse after several hard fought lighting wars is then stated to be as follows:

"The situation in La Crosse, then, is about this: After several years of effort, the city has not only failed to secure permanent competition in the electric lighting business, but it has been the means of causing more fixed capital to become invested in such plants than is really warranted by the demand for such lighting in that city. In other words, the lighting business in that city has been brought to a condition where it has to bear more in the way of fixed charges annually than would have been the case had the city adopted a wiser course of regulation than that which for services of this character can be had through competition."

The Question of Capitalization.—Taking up the matter of capital invested, it is said:

"Comparatively few facts have been presented that throw much of any light on the cost of, or the capital invested, in the plant of the La Crosse Gas and Electric Company. In the balance sheet of 1902 the cost of the entire plant—gas and electric—is given as $1,075,000, which seems to be the amount fixed at the reorganization in 1901. The securities outstanding against this cost value amounted to $1,150,000, and consisted of $550,000 of bonds, $150,000 of preferred stock and $450,000 of common stock. Since that time, or about 1905, another bond issue of $50,000 seems to have been made. The bonds now outstanding therefore amount to $600,000 and the preferred and common stock to an equal sum, making the total of capitalization $1,200,000. It is quite likely, however, that both the construction account and the bonds and stock outstanding represent a great many items besides the actual investment in the plant.

"The Company has not kept a regular depreciation account but it has made improvements in the plant each year, parts of which have been met out of the earnings. During 1902, according to the balance sheet for that year, these improvements amounted to $95,756.59. From that time up to June 1, 1907, about $152,395.01 were expended for similar purposes, increasing the total to $248,151.60. This amount is carried as 'additions to property' on the asset side of the balance sheet and is therefore swelling the assets to that extent.

The question of depreciation is an exceedingly important one. There is continually in progress in the plants of industries of this character, except perhaps in the land on which they are located, a waste or depreciation which is due to its use and to the ravages of time. A part of this wear and decay is offset by the ordinary repairs. Other parts are offset by certain maintenance charges over and above the ordinary repairs, and which usually consist of certain forms of renewals that are necessary for the upkeep of the plant. Other offsets again consist of actually replacing the property and machinery when worn out, or when it has become useless, and of charging the cost of same either directly to the operating expenses or to a depreciation account that has been provided for that purpose by periodical charges to expenses. This is not always the manner in which depreciation is met, but it furnishes in a general way some idea of how it may be provided for.

"Just how much should be allowed for depreciation is a matter that is closely connected with other factors, and must be determined upon the facts in each case. Some engineers of experience place it at about 3 per cent. on the total cost of the plant. Others place it at higher figures. Much depends upon the annual expenditures for repairs and maintenance."

Earnings of the Company.—The earnings of the corporation are next considered. Detailed statements of the gross earnings and the operating expenses for the past 5½ years were required. These estimates were closely examined by the Commission and are pronounced to be substantially correct. These figures show the following gross and net earnings of the electric lighting and heating plants and the operating expenses to have been in recent years as follows:

Gross earnings for electric light and heat: 1902, $57,361.86; 1903, $65,352.58; 1904, $106,188.95; 1905, $114,789.69; 1906, $100,267.32; 1907 (6 months), $55,260.52.

Operating expenses: 1902, $39,557.38; 1903, $53,009.16; 1904, $71,196.03; 1905, $80,251.15; 1906, $94,587.16; 1907 (6 months), $53,508.98.

Net earnings: 1902, $17,804.48; 1903, $12,343.42; 1904, $34,992.92; 1905, $34,538.53; 1906, $5,680.16; 1907 (6 months), $1,750.54.

Not a Big Money Maker.—Discussing the above figures the Commission says:

"From the facts relating to the value of plant and to its earnings and operating expenses, it is quite clear that it has not been a conspicuous success as a producer of net earnings. This is especially true when some allowance is made for depreciation. If the valuation of the plant is placed at $450,000, and if depreciation at the rate of 3 per cent. is allowed, there are only 2 years during the entire period when the earning applicable to interest on the investment has exceeded 4 per cent. on this valuation. The average annual net earnings that could be devoted to this purpose on the same basis are much lower than this. As a matter of fact the amount to only a trifle over 1 per cent. on the estimated value of the plant.

"During the past 2 years the net earnings are not even large enough to meet ordinary depreciation charges, much less any interest upon the investment, and as long as the rates charged for current remain as low as at present there is but little hope that the net earnings will increase."

[To be Concluded.]

ITEMS OF INTEREST FROM VARIOUS LOCA ITIES.

THE Stamford (Conn.) Gas and Electric Company will construct a fireproof governor house from the plans of Mr. Henry Marvin.

MR. EDMUND E. MILLER, formerly New Business Manager of the Union Gas and Electric Company, of Cincinnati, and later on associated with Mr. A. S. White, has become a member of the Cincinnati brokerage firm of W. F. Hutton & Co.

THE speaker of the evening at the last meeting of the Employees' Club, of the Union Gas and Electric Company, Cincinnati, held about a fortnight ago, was Prof. E. L. Elliott, Editor of the *Illuminating Engineer*, whose cogent speech was listened to by a large audience. His subject was "Artificial Illumination," and the keynote of his message was succinctly stated in the remark that "The matter of gas and electrical illumination has passed from the stage of a trade into the realm of science."

CORONER PARKER, of Detroit, Mich., has petitioned the Common Council of that city to enact an ordinance prohibiting the use of domestic gas heaters unless properly equipped with a flue connection.

BY arrangement, which is to date back to July 1st, this year, the Boston Consolidated Gas Company is to charge, for gas used in lighting the streets and public buildings, the sum of 78 cents per 1,000 cubic feet.

THE City Council of Beatrice, Neb., has entered into a contract with the Beatrice Gas and Power Company, under which the latter is to maintain 100 gas lamps of the Boulevard, mantle type at the rate of $25 per lamp per annum. The contract is to terminate December 31, 1912.

THIS partial account of action taken by the Board of Commissioners Dallas, Tex., respecting the Wathen gas franchise, speaks for itself:

Whereas, The said B. S. Wathen and associates have utterly failed to comply with the stipulations contained in Sec. 15 of said franchise in not depositing with the City Auditor the said sum of $2,500, as required by said ordinance; therefore, be it

Resolved, by the Board of Commissioners of the city of Dallas that said franchise be and is hereby annulled and of no force and effect, and that the City Attorney be and is hereby authorized to draft an ordinance in compliance with this resolution.

IN the last twelvemonth the Citizens Gas Company, of Quincy Mass., put down about 19 miles of mains; last year a like length was buried; next year it is proposed to add 19 more miles. When 1909 will have been reached the city will be practically completely piped.

THE Boston Consolidated Gas Company has disposed of the valuable property (19 to 24) owned by it on West street. It was carried on the city's tax rolls at a valuation of $341,000.

THOSE in charge of the artificial gas division of the business of the Columbus (O.) Gas and Fuel Company report much activity therein. The generating plant is being operated to its limit, and the overhauling and extending of the artificial gas mains will be gone on with until weather conditions necessitate its stoppage.

TELEGRAPHIC advices to the daily newspapers from Vienna, Austria, are to the effect that the City Council has decreed the construction o

a new gas plant, the estimated cost of which is $6,000,000. The present agreement is that the complete plant (it is to be constructed in 3 sections) will be in the operative in 1915.

THE payment by the United Gas Improvement Company into the city Treasury of Philadelphia, on account of royalties under the terms of the agreement by which the latter operates the Philadelphia city gas works, for the quarter year ended September 30th, was $171,962.48. This payment shows an output during the quarter of 1,744,295,500, and further shows an increase over the amount paid on like account for the corresponding period of 1906, of virtually $10,000.

THE plant of the Kennett-Avondale Gas Company, of Avondale, Pa., was recently sold at Receiver's sale. It was bought in by Messrs. John E. Huey and Wesley Talbot—the former was the Receiver of the properties.

"L. V. D.," writing from Berkeley, Cal., under date of the 24th October, incloses the following: "The Association of Electrical and Mechanical Engineers was addressed some evenings ago by Mr. John A. Britton, of the Pacific Gas and Electric Corporation—Mr. Britton is also a Regent of the University. The meeting was a very successful one, over 200 members being present. His subject was 'Engineering Possibilities in California,' and he told in detail of the wonderful development of engineering in this State, and of the exceptional amount of work done by graduates of the University towards this development. He emphasized the great fault of the majority of young engineers coming from our colleges at the present time, the fault of being too great theorists and dreamers. As an illustration of this development he took as an example the immense gas engine and electrical generation plant in the Potrero, recounting its efficiency and economy. Mr. Britton is an excellent lecturer."

IT looks that the time is close at hand for the long-talked-of amalgamation of the interests of the Pawtucket and Woonsocket (R. I.) Gas Companies.

THE Directors of the Fitchburg (Mass.) Gas and Electric Light Company have issued notice that from December 1st, 1907, a cut in the rates for incandescent electric lighting, ranging from 25 to 15 per cent., according to the nature of the service, will become operative.

THE appointment of Prof. Charles F. Burgess, of the Department of Applied Electro-Chemistry, University of Wisconsin, as the expert in gas and electrical matters for the State Railroad Rate Commission, has been confirmed.

WE understand that the supply of gas to and through the district of Turners Falls, Mass., from the plant of the Greenfield (Mass.) Gas Light Company, was commenced last week.

AT the annual meeting of the Cambridge (Mass.) Gas Light Company, the following officers were elected: Directors, W. A. Bullard, D. G. Tyler, S. B. Hildreth, Geo. A. Sawyer, H. C. Rand, A. C. Whitney and H. Endicott; President, W. A. Bullard; Treasurer, Secretary and Clerk, A. M. Barnes.

"V. M. T." is informed that the officers elected at the last annual meeting of the Knoxville (Tenn.) Gas Company - it was held October 9th—were: President, H. L. Doherty; Vice-President, G. G. Olmstead; Secretary and Treasurer, J. E. Hood; Superintendent, E. W. Young; Manager New Business Department, Robt. Choate.

AT the meeting of the American Society of Mechanical Engineers, to be held in the headquarters of the Society, 29 West 37th street, New York, the evening of Tuesday the 12th inst., the feature will be an address by Mr. Charles R. Pratt, whose theme will be the construction and operation of the gearless traction electric elevator, the latest example of which is now being installed in the new Singer building, New York. All are invited to attend the meeting.

SOME days ago the newspapers, through the medium of the Associated Press, announced that the cases of the County Treasurer of Cook county, Ills., against various public utilities corporations of Chicago, involving the tax levy of 1900 had been decided adversely to the city by the United States Supreme Court. The Companies affected were: The Chicago Union Traction, the Edison, the Chicago City Railway, the Chicago Consolidated Traction, the Chicago Telephone and the Peoples Gas Light and Coke. The suits were originally brought by the Companies in the Circuit Court to secure an injunction prohibiting the tax authorities of Cook county from enforcing a reassessment of taxes for 1900, which was undertaken on an order from the State Circuit Court of Sangamon county, after the taxes had been paid on the original assessment. The second levy was much in excess of the first, and the cases were taken to the Federal Courts on a plea of deprivation of property without due process of law.

MR. L. S. DAVIS, writing to us from Hartford City, Ind., under recent date, informs us that Messrs. Driscoll & McCauley, the well-known contracting firm, have almost completed the work of taking up the gas mains laid originally by the Fort Wayne Natural Gas Company and some independent manufacturers. Much of the Fort Wayne Company's pipe in Blackford county, Ind., is of 6 to 10-inch, and it is in good condition, despite its having been covered up for so many years. Most of the recovered pipe is being shipped to Kansas.

The following are the figures of the revised and generally lower rates for an electric current supply, as put out by the Fitchburg (Mass.) Gas and Electric Company:

Kilowatts,	Old Schedule.	New Schedule.
10	$1.90	$1.44
23	4.50	3.60
50	8.50	7.20
100	16.00	14.40
150	22.50	19.80
200	28.00	25.50
250	32.50	30.60
300	39.00	36.00
350	42.00	40.50
400	44.00	45.00
450	49.50	49.50
500	50.00	54.00
600	60.00	63.00
700	70.00	79.20
800	80.00	77.40
900	90.00	84.60
1,000	100.00	91.80
1,100	110.00	98.10
1,200	120.00	104.40
1,300	130.00	110.70
1,400	140.00	117.00
1,500	150.00	123.30

"F. R. N." writing from Bessemer, Ala., last week, said: "The work on the new gas plant is progressing with speed and care, and it is almost certain that gas will be turned on by January 1st. The piping of the houses is also well underway, and it is quite certain the Company will begin business with perhaps 250 separate consumers on its books. Manager Harrison is well pleased at the outlook, although he admits that a little less of the color line in the help would be an advantage."

THE lastest move in the Chelsea (Mass.) gas case is that the Board of Aldermen petitioned the Supreme Court for a writ of certiorari against the Board of Gas and Electric Light Commissioners with the view to quash the Board's records and proceedings in granting to the Boston Consolidated Gas Company a location for its pipes in Chelsea, with a right to put in pipes to supply East Boston. The petitioners themselves, as heretofore reported, refused to grant a location, the Company then going to the Board as stated, and it is the latter's ruling, granting to the Company a location, that the former prays to have judicially passed upon.

"DEAR JOURNAL: Innocence is certainly artless; and that its artlessness assumes many shapes or 'guises' is also certain. Gas men, of course, are well aware of these things, having often been brought to deal with them, and I venture to say that this little statement or explanation, which was made some days ago to the officials of the Wyandotte Gas Company, will hold a high place in the annals of excuses by the artless. A State warrant was issued for the apprehension of John Stelzer, a resident of 86 South First street, Kansas City, Kas., and it was named in the bill that he had 'tapped' the street main of the Wyandotte Gas Company, and that for months such tapping had been the means of affording him a plentiful supply of gas. Stelzer, somehow or another, learned that the warrant was 'out,' wherefore he hied himself forthwith to the Wyandotte Company's office and appealed to its heads for non-service, on three grounds - first promising to pay for the quantity of gas used by him as that quantity was estimated by the Comprny. He averred that when he became an occupant of the premises in question he discovered that the gas connections had been cut out. Being in immediate and urgent need of the illuminating and heating agent he connected the pipes himself, then waited serenely and patiently—ever so patiently—for the Company to send in its bill, just as it did to the house he formerly occupied. The writ or bill was not served.—M. F. McD."

IT will surprise many of the veteran gas men to learn that Mr. Jonathan D. Cathell, who was Superintendent of the Georgetown (D. C.) Gas Light Company from its formation, in 1853, to December 31, 1893, is still living, at the age of 91. He was born September 24th, 1817, in Washington, D. C., and five of his children are living.

MR. J. H. MASON is again in the service of the Athens (Ga.) Gas Company as its Superintendent.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, NOVEMBER 4, 1907.

The Market for Gas Securities.

The utter absurdity of stock quotations still rules, and it does not appear that current conditions are likely to change for some time. Consolidated opened to-day (Friday) at 79 to 80, and this in spite of the fact that the Company has declared its regular quarterly dividend of 1 per cent., payable the 16th prox. At 80 this is a cash return of 5 per cent. per annum. There is no question of its solvency or of the exceeding value of its property, or of its ability to pay 4 per cent. indefinitely even on the 80-cent basis.

Brooklyn Union is 75 to 100. Another anomaly is the situation in respect of Peoples, of Chicago, which has just declared a quarterly dividend of 1¼ per cent., payable the 26th prox., still the stock is offered this morning at 72¼. Who can possibly reconcile such phases?

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

NOVEMBER 4.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	79	80
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	92	97
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	..	105
Mutual	3,500,000	100	..	170
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	75	80
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p.ct.	1,000,000	..	98	104
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	99	98
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	..	97	101
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1930, M. & N	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	75	100
1st Con. 5's, due 1948, M. & N	15,000,000	..	..	102
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Bay State	50,000,000	50	¼	⅝
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	63	66
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	106¾
Cincinnati Gas and Electric Co.	29,500,000	100	95	96
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	87	88
Preferred	3,026,500	100	107½	103
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	..	90
Mortgage, 6's	3,500,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	96
Bonds	75,000	..	..	100
Detroit City Gas Co.	5,000,000	50	..	50
" Prior Lien 5's	4,618,000	1,000	..	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	15,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,235,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	100	105
Bonds, 5's	10,500,000	..	101	102½
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104½	105
Jackson Gas Co	250,000	50	82	..
" 1st Mtg. 5's	200,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	38
Bonds, 1st 5's	3,833,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	103
Preferred	2,500,000	100	75	100
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,004	1,000	60	65
Louisville	3,570,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	108	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies of Boston	25,000,000	100	44	44¼
Preferred	25,000,000	100	79	80
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	5,000,000	..	137	138
New Haven	2,000,000	25	200	..
Peoples G. Lt. & Coke Co., Chicago	25,000,000	100	72¾	72¼
1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	104½	105¼
San Francisco, Cal.	15,800,000	00	..	..
St. Joseph Gas Co. 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	90¼	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047 000	1,000	102	..
Washington, D. C	3,600,000	20	350	400
1st Mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del.	600,000	50	230	..

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Estimates furnished for the erection of complete gas works or the extension and modernizing of old works. All work warranted. Both water gas and coal gas.

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Position Wanted.

I want a position as superintendent or assistant superintendent of a gas company or a combined gas and electric company. Am a good mechanical engineer and thoroughly understand construction work, operation and the development of new business. Have had 12 years' special training in keeping down expenses and investment. Am now employed, but will make change December 1st, 1907.

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Position Wanted.

A successful gas and electric manager and engineer is open for a position in a city of not less than 25,000. All correspondence confidential. Can furnish best of references.
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SUPERINTENDENT WANTED,

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Must be thorough and practical on all points of gas making and distribution.

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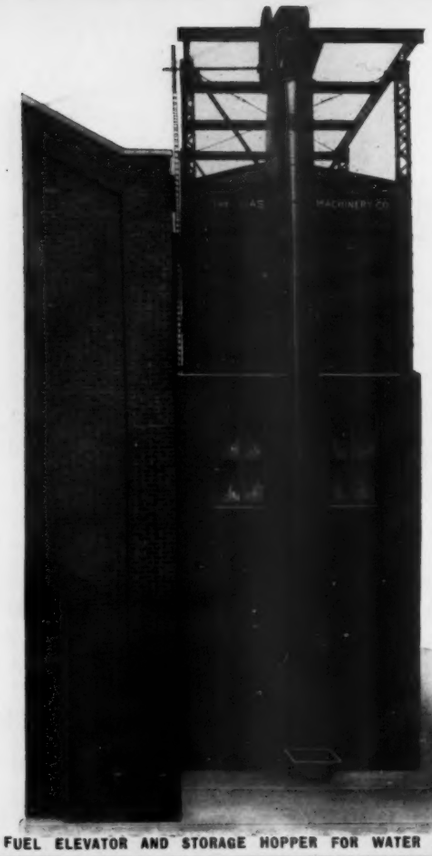

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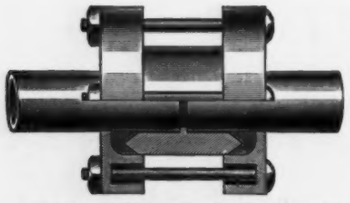

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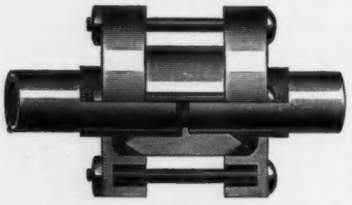

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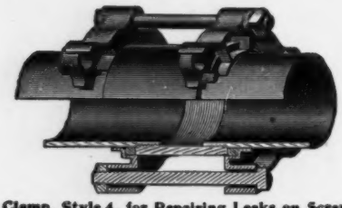

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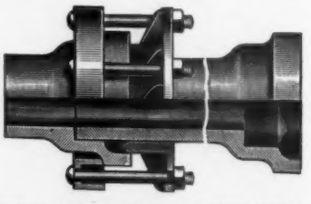

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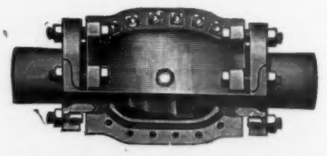

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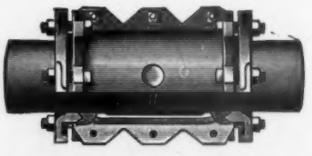

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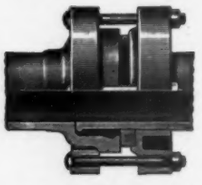

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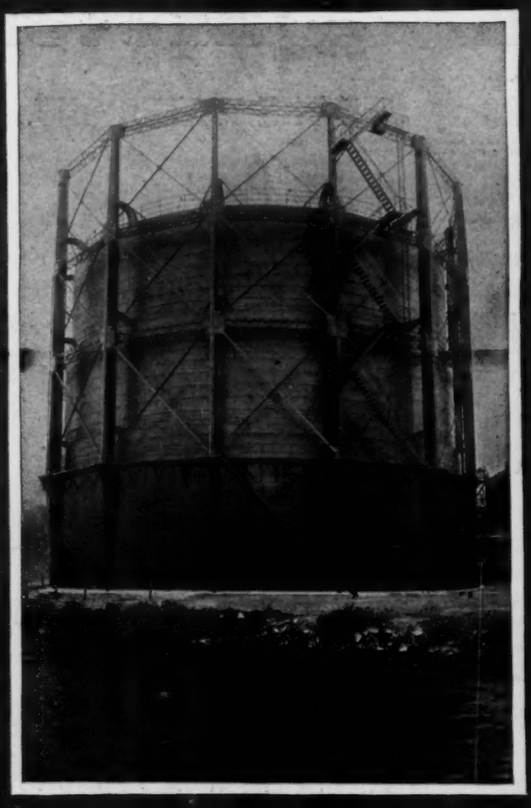

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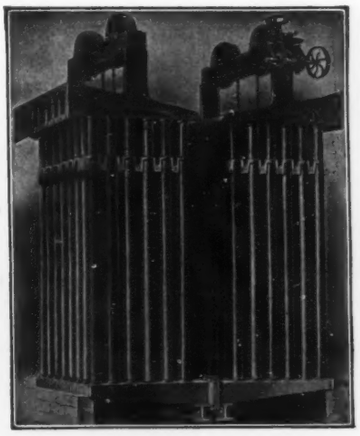

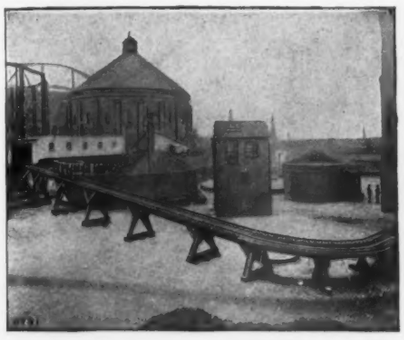

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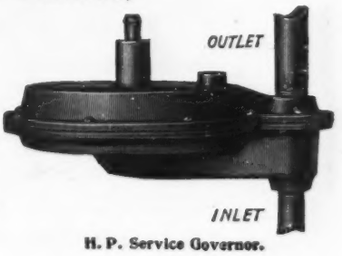

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THE LLOYD SENSITIVE BY-PASS VALVE
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WHEN
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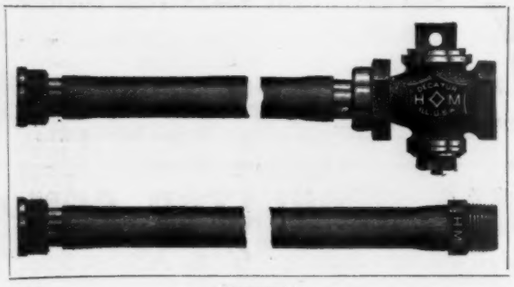
and stays closed the balance of the time.

Mueller Sweat Joint Gas Meter Connections.



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In Mueller Sweat Joint Gas Meter Connections the lead pipe fits close to the shoulder of the fitting, giving the greatest surface for the adhesion of solder and insuring the strongest joint. The patent sweating process lessens the cost over other styles of connections without lessening quality or serviceability.

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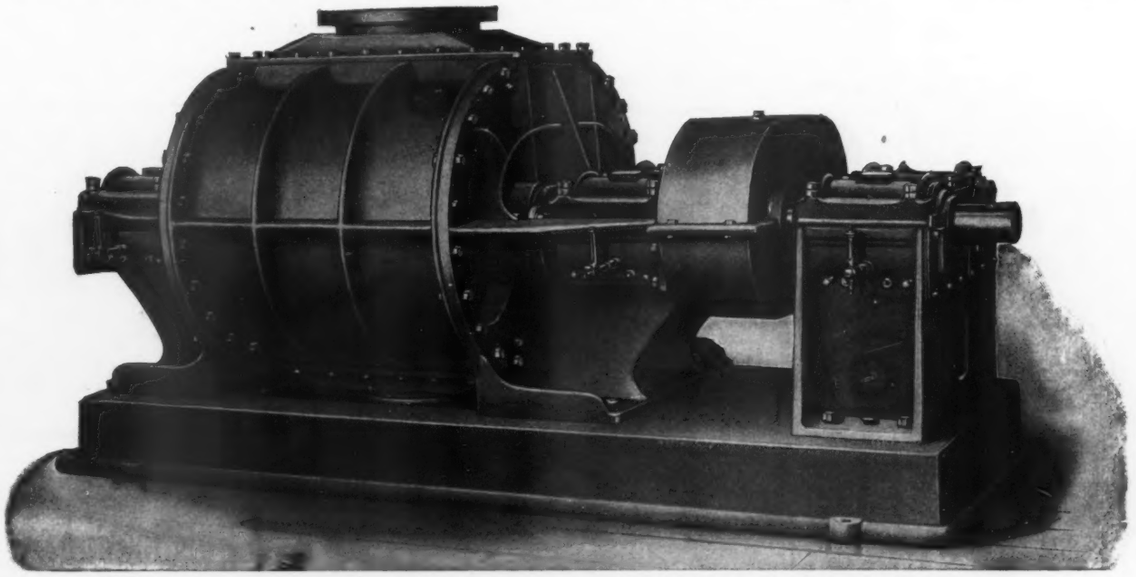

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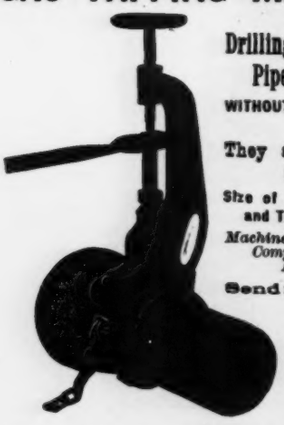

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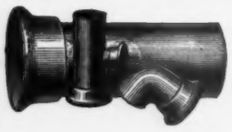

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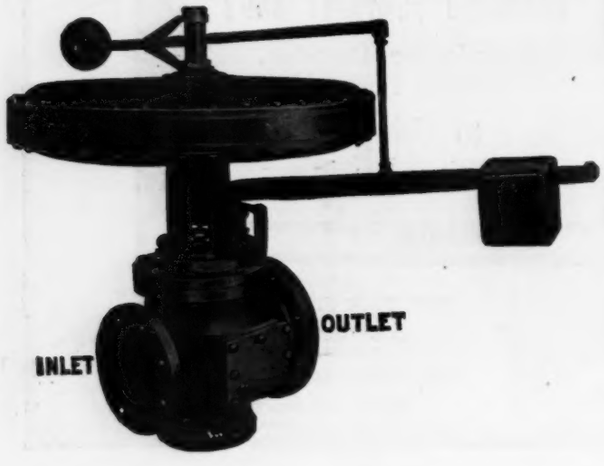

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Our DUPLEX SENSITIVE GOVERNOR, with Automatic Cutoff for district service, will reduce high pressure gas to inches of water without variation.

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PUBLIC LIGHTING TABLE.

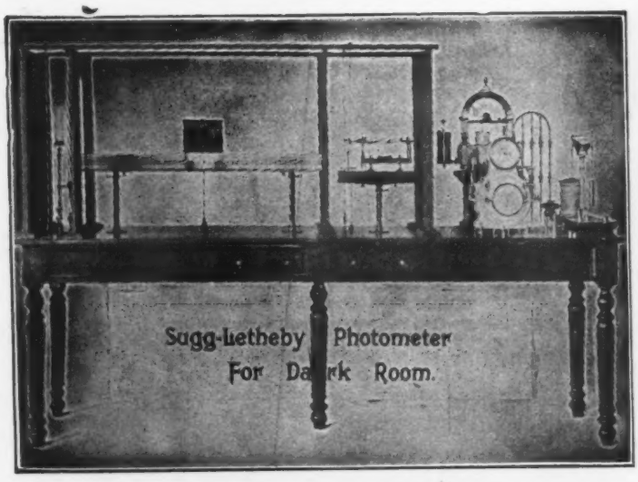
NOVEMBER, 1907.

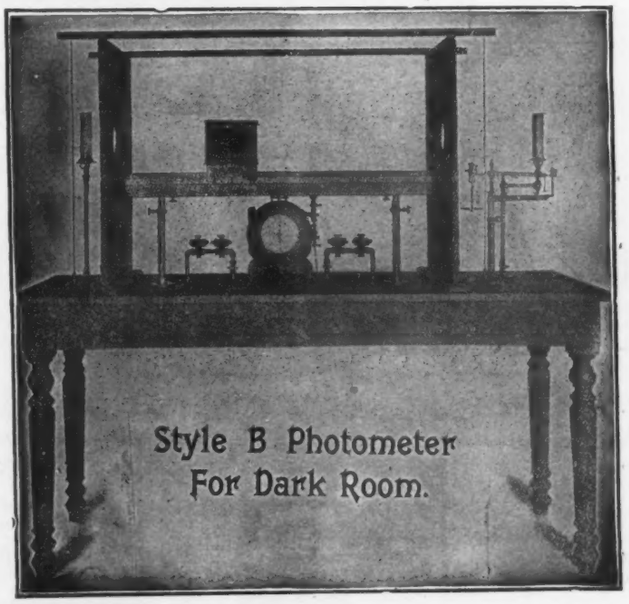
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Fri.	1	5.30 PM	3.40 AM
Sat.	2	5.30	5.30
Sun.	3	5.20	5.30
Mon.	4	5.20	5.30
Tue.	5	5.20 NM	5.30
Wed.	6	5.20	5.30
Thu.	7	5.20	5.30
Fri.	8	5.20	5.30
Sat.	9	5.20	5.30
Sun	10	8.20	5.40
Mon.	11	9.20	5.40
Tue.	12	10.30 FQ	5.40
Wed.	13	11.40	5.40
Thu.	14	12.50 AM	5.40
Fri.	15	2.00	5.40
Sat.	16	3.00	5.40
Sun.	17	4.10	5.50
Mon.	18	No L.	No L.
Tue.	19	No L. FM	No L.
Wed.	20	No L.	No L.
Thu.	21	5.10 PM	7.00 PM
Fri.	22	5.10	7.50
Sat.	23	5.10	8.40
Sun.	24	5.10	9.30
Mon.	25	5.10	10.20
Tue.	26	5.10	11.20
Wed.	27	5.10 LQ	12.20 AM
Thu.	28	5.10	1.20
Fri.	29	5.10	2.20
Sat.	30	5.10	3.30

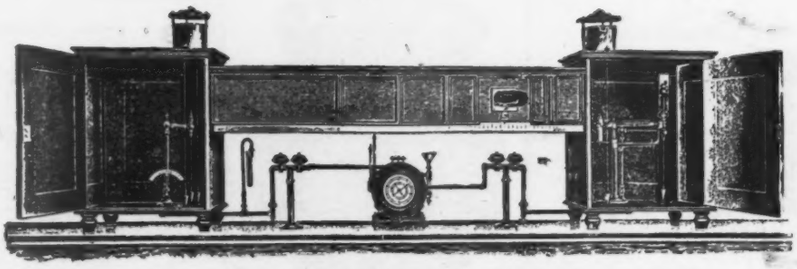
TOTAL HOURS DURING 1907.

By Table No. 1.

	Hrs.Min.
January	211.10
February	193.40
March	182.10
April	167.00
May	157.00
June	145.30
July	151.50
August	162.20
September	175.30
October	202.40
November	209.30
December	231.50
Total, yr.	2190.20







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

NOVEMBER, 1907.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. All Night Lighting. Light	Extinguish.
		P. M.	A.M.
Fri.	1	4.45	5.35
Sat.	2	4.45	5.35
Sun.	3	4.45	5.35
Mon.	4	4.45	5.35
Tue.	5	4.40	5.45
Wed.	6	4.40	5.45
Thu.	7	4.40	5.45
Fri.	8	4.40	5.45
Sat.	9	4.40	5.45
Sun.	10	4.40	5.45
Mon.	11	4.40	5.45
Tue.	12	4.30	6.00
Wed.	13	4.30	6.00
Thu.	14	4.30	6.00
Fri.	15	4.30	6.00
Sat.	16	4.30	6.00
Sun.	17	4.30	6.00
Mon.	18	4.30	6.00
Tue.	19	4.25	6.00
Wed.	20	4.25	6.00
Thu.	21	4.25	6.00
Fri.	22	4.25	6.00
Sat.	23	4.25	6.00
Sun.	24	4.25	6.00
Mon.	25	4.25	6.00
Tue.	26	4.20	6.10
Wed.	27	4.20	6.10
Thu.	28	4.20	6.10
Fri.	29	4.20	6.10
Sat.	30	4.20	6.10

TOTAL HOURS DURING 1907.

By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 512 Oak Street.

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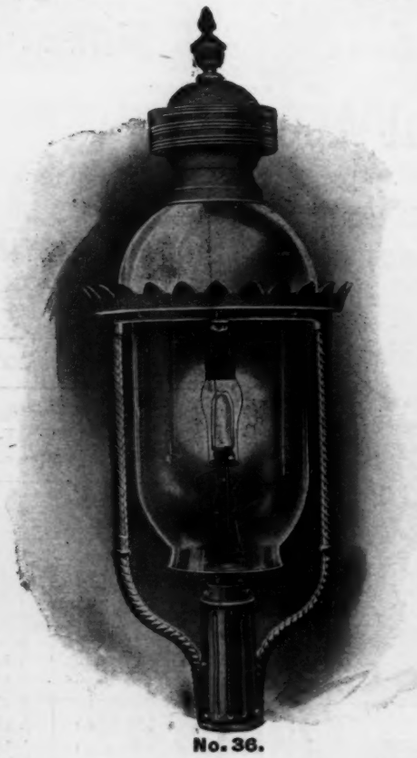
....OF AMERICA....



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Everett, Mass.
Jenkintown, Pa. (2d contract).
Coney Island, N. Y.
Mexico, Mo.
Jacksonville, Fla.
Syracuse, N. Y. (2d contract).
Atlanta, Ga. (3d contract).
Holyoke, Mass.
Peoria, Ills.
Schnectady, N. Y. (2d contract).
Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
Sioux Falls, S. D. (3d contract).
Philadelphia, Pa.

TOTAL SETS INSTALLED TO JULY 1, 1907, ... 34
TOTAL SETS TO DATE, ... 668
TOTAL DAILY CAPACITY, ... 541,655,000 cu. ft.

Tar Extractors for Carburetted Water Gas.
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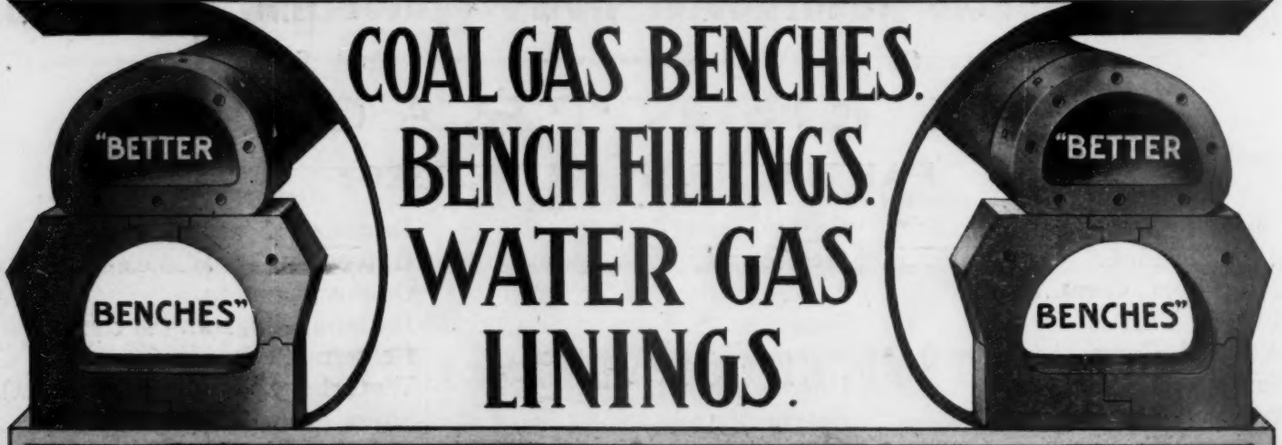

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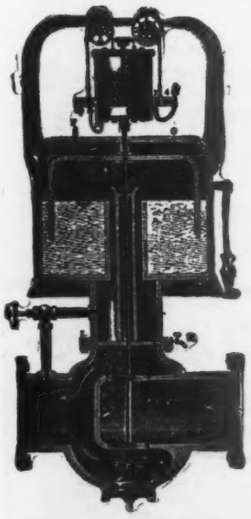

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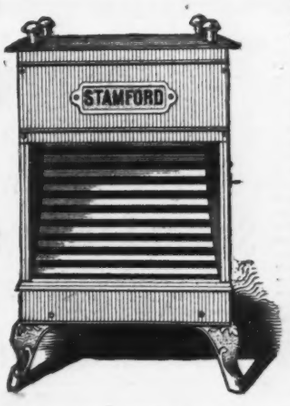

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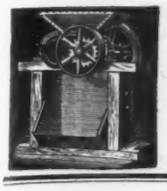

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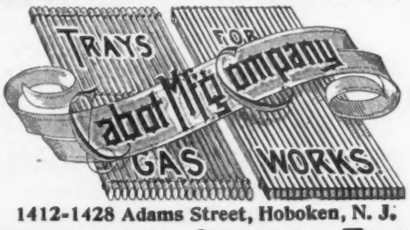

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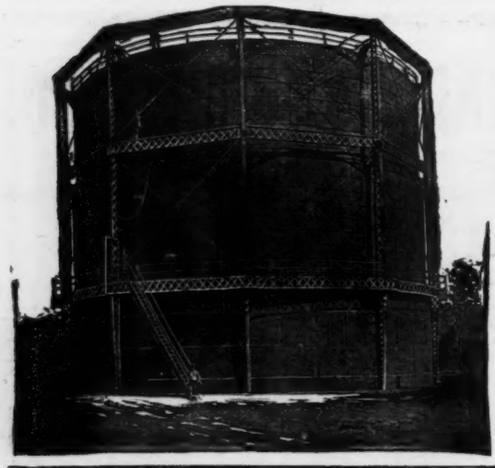

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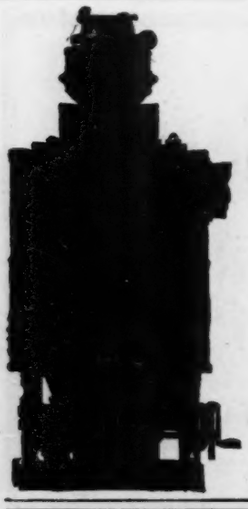

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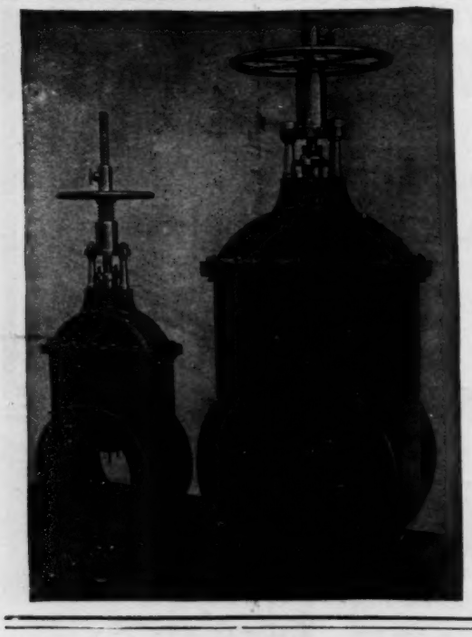

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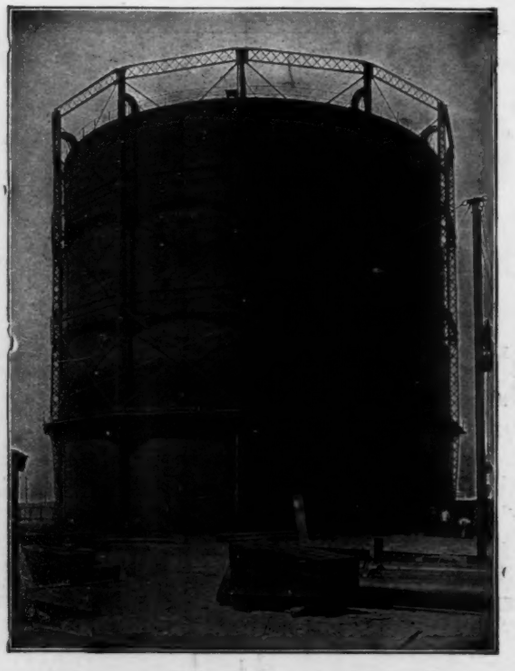

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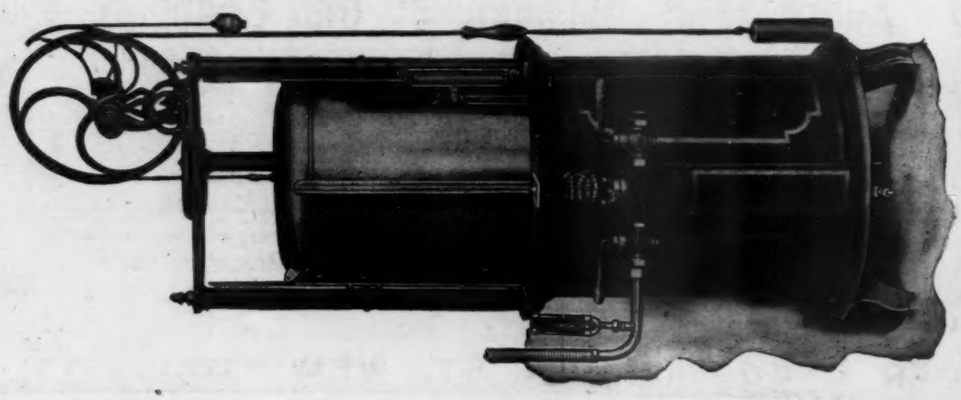

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